2. INVERTER DRIVEN MULTI-INDOOR UNIT HEAT RECOVERY CLIMATE CONTROL SYSTEM

(Simultaneous heating & Cooling 3 Pipe System)

(OUTDOOR UNIT)

Refrigerant R407C use models

FDCP224HKXRE2A, 280HKXRE2A

FDCP224HKXRE2V, 280HKXRE2V

(INDOOR UNIT)

FDTJ28HKXE2
36HKXE2
45HKXE2
56HKXE2
71HKXE2
90HKXE2
112HKXE2
140HKXE2

FDTWJ28HKXE2B
45HKXE2B
56HKXE2B
71HKXE2B
90HKXE2B
112HKXE2B
140HKXE2B

FDTQJ22HKXE3
28HKXE3
36HKXE3

FDTSJ45HKXE2B
71HKXE2B

FDRJ45HKXE2
56HKXE2
71HKXE2
90HKXE2
112HKXE2
140HKXE2

FDQMJ36HKXE3

FDUMJ36HKXE2
45HKXE2
56HKXE2
71HKXE2
90HKXE2
112HKXE2
140HKXE2

FDEJ36HKXE2B
45HKXE2B
56HKXE2B
71HKXE2B
112HKXE2B
140HKXE2B

FDKJ22HKXE2
28HKXE2
36HKXE2
45HKXE2
56HKXE2
71HKXE2

FDFLJ28HKXE2
45HKXE2
71HKXE2

FDFUJ28HKXE2
45HKXE2
56HKXE2
71HKXE2

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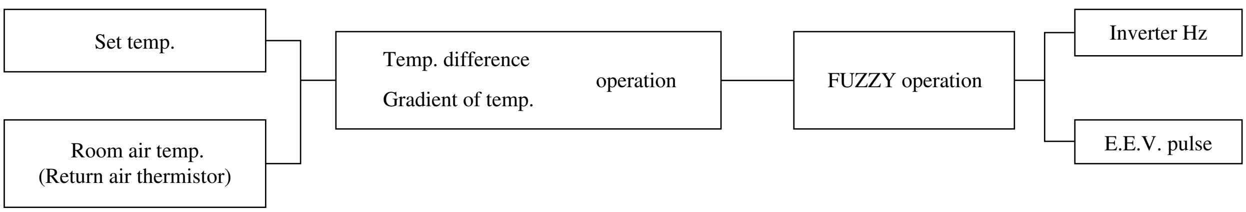
2.1 GENERAL INFORMATION

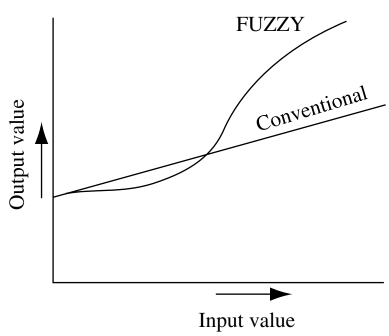
2.1.1 Specific features

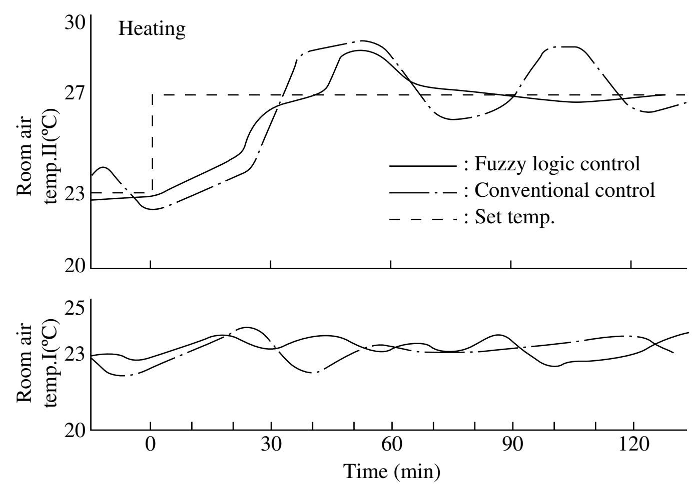
(1) Fuzzy control

(a) Response speed and stability are enhanced.

- The system automatically controls changes of return air temperature, set temperature and room temperature according to the fuzzy control.
- The system response speed, can keep room temperature constant, and can adjust room temperature to set temperature quickly.







(b) Elimination of temperature irregularity as the time of operation ON/OF control

- The system finely controls the compressor to room temperature according to the temperature thermistor, air conditions room temperature consistently and improves cooling or heating feeling in each room(or minimize influence of shutdown in other room).

(2) Super lynk system

- Non polar 2-core signal wires for indoor, outdoor units by means of the automatic polarity selection.
- In addition, the max. 48 units can be controlled with a pair of signal wires. The high speed transmission method same as the computer network system [start up of 48 units can be completed within a few seconds by the determination of operation mode and the start of operation].
- As separate power supplies for the indoor and the outdoor units are employed, a pair of 2 signal wires only are required for the inter connecting wiring of indoor and outdoor uniits regardless of the number of units so that the installation work can be simplified, the cost of wiring work can be curtailed and causes of wiring error can be minimized.

(3) Automatic cooling/heating operation is possible with one system piping.

- Simultaneous mixed operation of cooling and heating can be selected freely every indoor unit. The air-conditioning for space such as the OA room where cooling is required throughout the year or for the cooling/heating space for ordinary office can be treated with only one piping system, which contributes to the simplification of the whole system.

  In addition, this system can effectively cope with the space where the air-conditioning condition is different depending on the time zone. Its layout can also be changed smoothly.

(4) Floor layout can be changed by resetting address unit number.

- For change of floor layout, the control group can be recombined only by resetting address unit number.

(5) Installation of automatic address setting function

- The address setting method are divided into three types according to wiring method: "Automatic Address Setting,""Remote controller Address Setting" and "Manual Address Setting," In case of the Automatic Address Setting, no address needs be set as usual.

(6) Connectable indoor capacity

Capacity from 50% to 130% is possible.

- FDCP224HKXRE2A, 224HKXRE2V
  Number of connectable units : 1 to 12 units
  Connectable capacity : 11000 ~ 29200 W
- FDCP280HKXRE2A, 280HKXRE2V
  Number of connectable units : 1 to 16 units
  Connectable capacity : 13200 ~ 36400 W

(7) Cooling opetation down to -5˚C outdoor temperature

(8) Indoor units are available with 9 capacities, in 11 types and 53 models.

- 9 capacities…22(0.8 HP), 28(1 HP), 36(1.25 HP), 45(1.6 HP), 56(22 HP), 71(2.5 HP), 90(3.2 HP), 112(4 HP) and 140(5 HP).
- 11 types…Ceiling recessed type (FDT), 2-way outlet ceiling recessed type(FDTW), Ceiling recessed single air supply port type (FDTQ), 1-way outlet ceiling recessed type(FDTS), Cassetteria type(FDR), Medium static pressure ducted type (FDQM), Satellite ducted type(FDUM), Ceiling suspension type(FDE), Wall mounted type(FDK) , Floor standing exposed type(FDFL) and Floor standing hidden type (FDFU).

(9) Long piping design offeres One way piping length of 100 m

- Indoor and outdoor units can have a level difference of up to 50 m, with a one way piping length of up to 100 m. This is the top-class long piping design in the industry. A level difference of as much as 15 m between indoor units ensures that the system can meet a wide variety of air conditioning requirements in any building.

(10) Layout free refrigerant piping

The branch type piping makes the system flexible enough to satisfy any layout plan on the floor or in a room.

(11) Improvement of serviceability

(a) Failures of indoor unit and outdoor units are shown on the liquid crystal display on the remote controller.

- Failures of indoor unit and outdoor units can be checked by remote controller.

(b) Easy checking of outdoor inspection LED.

- The LED can be checked without removing the service panel, and faulty units can be easily indentified out of several units.

2.1.2 How to read the model name

Example: FDC P 224 H KXR E 2 A

- FDC — Model name: Indoor unit : FDT, FDTW, FDTQ, FDTS, FDR, FDQM, FDUM, FDE, FDK, FDFL , FDFU; Outdoor unit : FDC
- P — R407C models
- 224 — Nominal capacity
- H — Heat pump type
- KXR — Multi KXR series
- E — Application power source...See the specifications
- 2 — CE marking model
- A — Power source (A : 415V 50Hz / V : 380V 50Hz)

2.1.3 Table of models

Model \ Capacity	22	28	36	45	56	71	90	112	140
Ceiling recessed type (FDT)		○	○	○	○	○	○	○	○
2-way outlet ceiling recessed type (FDTW)		○		○	○	○	○	○	○
Ceiling recessed single air supply port type (FDTQ)	○	○	○						
1-way outlet ceiling recessed type (FDTS)				○		○			
Cassetteria type (FDR)				○	○	○	○	○	○
Medium static pressure ducted type (FDQM)			○						
Stellite ducted type (FDUM)			○	○	○	○	○	○	○
Ceiling suspension type (FDE)			○	○	○	○		○	○
Wall mounted type (FDK)	○	○	○	○	○	○			
Floor standing exposed type (FDFL)		○		○		○			
Floor standing hidden type (FDFU)		○		○	○	○			
Outdoor units to be combined FDC	FDCP224HKXRE2A, 224HKXRE2V (8 Horse Power)					FDCP280HKXRE2A, 280HKXRE2V (10 Horse Power)			

2.1.4 Table of indoor units panel (Optional)

Model		Parts Model
FDT	Capacity:28,36,45,56, 71,90,112,140	T-PSA-32W-E
FDTW (Standard type)	Capacity:28,45,56	TW-PSA-22W-E
	Capacity:71,80	TW-PSA-32W-E
	Capacity:112,140	TW-PSA-42W-E
FDTW (Attachment of ceiling material type)	Capacity:28,45,56	TW-PSB-28W-E
	Capacity:71,90	TW-PSB-38W-E
	Capacity:112,140	TW-PSB-48W-E
FDTQ (Direct blow panel)	Capacity:22,28,36	TQ-PSA-13W-E
		TQ-PSB-13W-E
FDTQ (Duct panel)	Capacity:22,28,36	QR-PNA-13W-E
		QR-PNB-13W-E
FDTS	Capacity:45	TS-PSA-26W-E
	Capacity:71	TS-PSA-36W-E
FDR (Silent type)	Capacity:45,56	R-PNLS-26W-E
	Capacity:71,90	R-PNLS-36W-E
	Capacity:112,140	R-PNLS-46W-E
FDR (Canvas duct type)	Capacity:45,56	R-PNLC-26W-E
	Capacity:71,90	R-PNLC-36W-E
	Capacity:112,140	R-PNLC-46W-E

2.2 SELECTION DATA

2.2.1 Specifications

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models FDTJ28HKXE2, 36HKXE2

Item \ Models		FDTJ28HKXE2(3)	FDTJ36HKXE2(3)
Nominal cooling capacity*1	**W**	**2800**	**3600**
Nominal heating capacity*2	**W**	**3200**	**4000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 36 Me: 34 Lo: 32	
Exterior dimensions Height × Width × Depth	**mm**	**Unit:260 × 840 × 840 Panel:30 × 950 × 950**	
Net weight	**kg**	**Unit:24 Panel:7**	
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Turbo fan × 1	
Motor	**W**	**17×1**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 12 Me: 10 Lo: 9**	
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ6.35(1/4"), Gas line:φ12.7(1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas line)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
FDTJ28,36 type	T-PSA-32W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTJ45HKXE2, 56HKXE2, 71HKXE2

Item \ Models		FDTJ45HKXE2(3)	FDTJ56HKXE2(3)	FDTJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**4500**	**5600**	**7100**
Nominal heating capacity*2	**W**	**5000**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 37 Me: 35 Lo: 34		Hi: 38 Me: 36 Lo: 34
Exterior dimensions Height × Width × Depth	**mm**	**Unit:260 × 840 × 840 Panel:30 × 950 × 950**		
Net weight	**kg**	**Unit:24 Panel:7**		
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Turbo fan × 1		
Motor	**W**	**20×1**		**25×1**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 15 Me: 12 Lo: 10**		**Hi: 16 Me: 13 Lo: 11**
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ6.35(1/4") Gas line:ϕ12.7(1/2")**	**Liquid line:ϕ 9.52(3/8") Gas line:ϕ15.88(5/8")**	
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**		

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
FDTJ45,56,71 type	T-PSA-32W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTJ90HKXE2, 112HKXE2, 140HKXE2

Item \ Models		FDTJ90HKXE2(3)	FDTJ112HKXE2(3)	FDTJ140HKXE2(3)
Nominal cooling capacity*1	**W**	**9000**	**11200**	**14000**
Nominal heating capacity*2	**W**	**10000**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 42 Me: 40 Lo: 38	Hi: 47 Me:43 Lo: 38	Hi: 49 Me: 46 Lo: 43
Exterior dimensions Height × Width × Depth	**mm**	**Unit: 260 × 840 × 840 Panel:30 × 950 × 950**	**Unit: 320 × 840 × 840 Panel:30 × 950 × 950**	
Net weight	**kg**	**Unit:24 Panel:7**	**Unit:28 Panel:7**	**Unit:30 Panel:7**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Turbo fan × 1		
Motor	**W**	**50 × 1**	**80 × 1**	**130 × 1**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 21 Me: 15 Lo: 12**	**Hi: 28 Me: 24 Lo: 21**	**Hi: 30 Me: 26 Lo: 22**
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**	**Liquid line:ϕ9.52(3/8") Gas line:ϕ19.05(3/4")**	
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**		

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1"UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
FDTJ90,112,140 type	T-PSA-32W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(b) 2-way outlet ceiling recessed type (FDTW)

Models FDTWJ28HKXE2B, 45HKXE2B, 56HKXE2B

Item \ Models		FDTWJ28HKXE2B(3)	FDTWJ45HKXE2B(3)	FDTWJ56HKXE2B(3)
Nominal cooling capacity*1	**W**	**2800**	**4500**	**5600**
Nominal heating capacity*2	**W**	**3200**	**5000**	**6300**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 39 Me:36 Lo: 33		
Exterior dimensions Height × Width × Depth	**mm**	**Unit:280× 817×620 Panel:8 ×1055 ×680**		
Net weight	**kg**	**Unit:19 Panel:7**		
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Turbo fan ×1		
Motor	**W**	**30×1**		
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**		
Fresh air intake		Possible		
Air filter, Q'ty		Long life filter × 1(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ6.35(1/4") Gas line:ϕ12.7(1/2")**		**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		**Decorative Panel**		
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**		

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.	
	Standard type	Attachment of ceiling material type
FDTWJ28,45,56 type	TW-PSA-22W-E	TW-PSB-28W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTWJ71HKXE2B, 90HKXE2B

Item \ Models		FDTWJ71HKXE2B(3)	FDTWJ90HKXE2B(3)
Nominal cooling capacity*1	**W**	**7100**	**9000**
Nominal heating capacity*2	**W**	**8000**	**10000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 41 Me: 38 Lo: 35	Hi: 41 Me: 39 Lo: 36
Exterior dimensions Height × Width × Depth	**mm**	**Unit:330 ×1054 × 620 Panel:8 ×1300 × 680**	
Net weight	**kg**	**Unit:26 Panel:9**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillay tube	
Air handling equipment Fan type & Q'ty		Turbo fan × 1	
Motor	**W**	**35×1**	**40×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 16 Me: 13 Lo: 11**	**Hi: 19 Me: 16 Lo: 12**
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ9.52(3/8"),Gas line:φ15.88(5/8")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.	
	Standard type	Attachment of ceiling material type
FDTWJ71,90 type	TW-PSA-32W-E	TW-PSB-38W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDTWJ112HKXE2B, 140HKXE2B

Item \ Models		FDTWJ112HKXE2B(3)	FDTWJ140HKXE2B(3)
Nominal cooling capacity*1	**W**	**11200**	**14000**
Nominal heating capacity*2	**W**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 44 Me: 41 Lo: 38	Hi: 45 Me: 42 Lo: 39
Exterior dimensions Height × Width × Depth	**mm**	**Unit:345 ×1524 × 620 Panel:8 ×1770 × 680**	
Net weight	**kg**	**Unit:38 Panel:11**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Turbo fan ×2	
Motor	**W**	**40 × 2**	**50 × 2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 23**	**Hi: 32 Me: 28 Lo: 24**
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ9.52(3/8"),Gas line:φ19.05(3/4")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas linse)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.	
	Standard type	Attachment of ceiling material type
FDTWJ112,140 type	TW-PSA-42W-E	TW-PSB-48W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(c) Ceiling recessed single air supply port type (FDTQ)

Model FDTQJ22HKXE3

Item \ Model		FDTQJ22HKXE3(3)			
Panel name		**Direct blow panel**		**Duct panel(4)**	
Panel model(Option)		**TQ-PSA-13W-E**	**TQ-PSB-13W-E**	**QR-PNA-13W-E**	**QR-PNB-13W-E**
Nominal cooling capacity*1	**W**	**2200**			
Nominal heating capacity*2	**W**	**2500**			
Power source		**1 Phase, 220/240V 50Hz**			
Noise level	dB(A)	Hi: 38 Lo: 33		Hi: 42 Lo: 39	
Exterior dimensions Height × Width × Depth	**mm**	**Unit:250×570×570 Panel:35×625×650**	**Unit:250×570×570 Panel:35×780×650**	**Unit:250×570×570 Panel:35×625×650**	**Unit:250×570×570 Panel:35×780×650**
Net weight	**kg**	**Unit:19 Panel:2.5**	**Unit:19 Panel:3**	**Unit:19 Panel:2.5**	**Unit:19 Panel:3**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan ×1			
Motor	**W**	**20 × 1**			
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 7 Lo: 5.4**		**Hi: 7 Lo: 6.5**	
Available static pressure(at Hi)	**Pa**	**—**		**30**	
Fresh air intake		Possible			
Air filter, Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		**Remote control switch (Optional:RCD-HKX-E2)**	
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ6.35(1/4"), Gas line:ϕ12.7(1/2")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Decorative Panel**			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "3", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(4) This is the panel to be used when modified to the Duct panel type on site. See page 177 for the execution.

Model FDTQJ28HKXE3

Item \ Model		FDTQJ28HKXE3[(3)]			
Panel name		Direct blow panel		Duct panel[(4)]	
Panel model(Option)		TQ-PSA-13W-E	TQ-PSB-13W-E	QR-PNA-13W-E	QR-PNB-13W-E
Nominal cooling capacity*[1]	W	2800			
Nominal heating capacity*[2]	W	3200			
Power source		1 Phase, 220/240V 50Hz			
Noise level	dB(A)	Hi: 38 Lo: 33		Hi: 42 Lo:39	
Exterior dimensions Height × Width × Depth	mm	Unit:250×570×570 Panel:35×625×650	Unit:250×570×570 Panel:35×780×650	Unit:250×570×570 Panel:35×625×650	Unit:250×570×570 Panel:35×780×650
Net weight	kg	Unit:19 Panel:2.5	Unit:19 Panel:3	Unit:19 Panel:2.5	Unit:19 Panel:3
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan ×1			
Motor	W	20 × 1			
Starting method		Line starting			
Air flow(Standard)	CMM	Hi: 7 Lo: 5.4		Hi: 7 Lo: 6.5	
Available static pressure(at Hi)	Pa	—		30	
Fresh air intake		Possible			
Air filter, Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		Remote control switch (Optional:RCD-HKX-S-E2)		Remote control switch (Optional:RCD-HKX-E2)	
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	mm(in)	Liquid line: ϕ6.35(1/4"), Gas line: ϕ12.7(1/2")			
Connecting method		Flare piping			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		Mounting kit			
Optional parts		Decorative Panel			
Outdoor units to be combined		FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*[1]	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*[2]	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "3", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(4) This is the panel to be used when modified to the Duct panel type on site. See page 177 for the execution.

Model FDTQJ36HKXE3

Item \ Model		FDTQJ36HKXE3(3)			
Panel name		**Direct blow panel**		**Duct panel(4)**	
Panel model(Option)		**TQ-PSA-13W-E**	**TQ-PSB-13W-E**	**QR-PNA-13W-E**	**QR-PNB-13W-E**
Nominal cooling capacity*1	**W**	**3600**			
Nominal heating capacity*2	**W**	**4000**			
Power source		**1 Phase, 220/240V 50Hz**			
Noise level	dB(A)	Hi: 38 Lo: 33		Hi: 42 Lo:39	
Exterior dimensions Height × Width × Depth	**mm**	**Unit:250×570×570 Panel:35×625×650**	**Unit:250×570×570 Panel:35×780×650**	**Unit:250×570×570 Panel:35×625×650**	**Unit:250×570×570 Panel:35×780×650**
Net weight	**kg**	**Unit:19 Panel:2.5**	**Unit:19 Panel:3**	**Unit:19 Panel:2.5**	**Unit:19 Panel:3**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan ×1			
Motor	**W**	**20× 1**			
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 7 Lo: 5.4**		**Hi: 7 Lo: 6.5**	
Available static pressure(at Hi)	**Pa**	—		**30**	
Fresh air intake		Possible			
Air filter, Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**		**Remote control switch (Optional:RCD-HKX-E2)**	
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ6.35(1/4"), Gas line:ϕ12.7(1/2")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Decorative Panel**			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "3", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(4) This is the panel to be used when modified to the Duct panel type on site. See page 177 for the execution.

(d) 1-way outlet ceiling recessed type (FDTS)

Models FDTSJ45HKXE2B, 71HKXE2B

Item \ Model		FDTSJ45HKXE2B(3)	FDTSJ71HKXE2B(3)
Nominal cooling capacity*1	**W**	**4500**	**7100**
Nominal heating capacity*2	**W**	**5000**	**8000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 43 Me: 40 Lo: 38	Hi: 44 Me: 40 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:194 × 1040 ×650 Panel:10 × 1290 ×770**	**Unit:194 × 1300 ×650 Panel:10 × 1500 ×790**
Net weight	**kg**	**Unit:26 Panel:6**	**Unit:30 Panel:7**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	Centrifugal fan × 4
Motor	**W**	**40×1**	**25×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**	**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Possible	
Air filter, Q'ty		Long life filter × 1(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ6.35(1/4") Gas line:ϕ12.7(1/2")**	**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		**Decorative Panel**	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

●Decorative Panel model (Optional)

Model \ Item	Panel Part No.
	With Auto Swing
FDTSJ45 type	TS-PSA-26W-E
FDTSJ71 type	TS-PSA-36W-E

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(e) Cassetteria type (FDR)

Models FDRJ45HKXE2, 56HKXE2

Item / Models		FDRJ45HKXE2(4)		FDRJ56HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-26W-E**	**R-PNLC-26W-E**	**R-PNLS-26W-E**	**R-PNLC-26W-E**
Nominal cooling capacity*1	**W**	**4500**		**5600**	
Nominal heating capacity*2	**W**	**5000**		**6300**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38	Hi:43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:355 × 750 ×635 Panel:10 × 1040 ×750**	**Unit:(299+α) × 750×635 Panel:10 × 864 × 585**	**Unit:355 × 750 ×635 Panel:10 × 1040 ×750**	**Unit:(299+α) × 750×635 Panel:10 × 864 × 585**
Net weight	**kg**	**Unit:30 Panel:7**	**Unit:30 Panel:5**	**Unit:30 Panel:7**	**Unit:30 Panel:5**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**55× 1**			
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 11**			
Available static pressure (at Me)	**Pa**	**Standard:50, Hi speed:85**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ6.35(1/4") Gas line:ϕ12.7(1/2")**		**Liquid line:ϕ9.52(3/8") Gas line:ϕ15.88(5/8")**	
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) Canvas panel is used in combination with following canvas duct
Canvas duct: HA01503

(4) The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for Europearn nations which require CE marking.

(5) Indoor unit height of canvas specification type is higher than the other type for canvas duct portion.

Models FDRJ71HKXE2, 90HKXE2

Item \ Models		FDRJ71HKXE2(4)		FDRJ90HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-36W-E**	**R-PNLC-36W-E**	**R-PNLS-36W-E**	**R-PNLC-36W-E**
Nominal cooling capacity*1	**W**	**7100**		**9000**	
Nominal heating capacity*2	**W**	**8000**		**10000**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38	Hi: 43 Me: 40 Lo: 37	Hi: 44 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:355 × 950 ×635 Panel:10 × 1240 ×750**	**Unit:(299+α) × 950×635 Panel:10 × 1064 × 585**	**Unit:355 × 950 ×635 Panel:10 × 1240 ×750**	**Unit:(299+α) × 950×635 Panel:10 × 1064 × 585**
Net weight	**kg**	**Unit:35 Panel:8**	**Unit:35 Panel:6**	**Unit:35 Panel:8**	**Unit:35 Panel:6**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**90 × 1**		**100 × 1**	
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 18 Me: 16 Lo: 14**		**Hi: 20 Me: 18 Lo: 15**	
Available static pressure (at Me)	**Pa**	**Standard:45, Hi speed:80**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 1(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52(3/8"),Gas line:ϕ15.88(5/8")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) Canvas panel is used in combination with following canvas duct
Canvas duct: HA01490

(4) The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for European nations which require CE marking.

(5) Indoor unit height of canvas specification type is higher than the other type for canvas duct portion.

Models FDRJ112HKXE2, 140HKXE2

Item \ Models		FDRJ112HKXE2(4)		FDRJ140HKXE2(4)	
Air inlet panel		**Silent panel**	**Canvas panel**	**Silent panel**	**Canvas panel**
Panel model (Option)		**R-PNLS-46W-E**	**R-PNLC-46W-E**	**R-PNLS-46W-E**	**R-PNLC-46W-E**
Nominal cooling capacity*1	**W**	**11200**		**14000**	
Nominal heating capacity*2	**W**	**12500**		**16000**	
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 45 Me: 42 Lo: 38	Hi: 46 Me: 43 Lo: 39	Hi: 46 Me: 43 Lo: 39	Hi: 47 Me: 44 Lo: 40
Exterior dimensions Height × Width × Depth	**mm**	**Unit:406 × 1370×635 Panel:10 × 1660×750**	**Unit:(350+α) × 1370 × 635 Panel:10 × 1484 ×585**	**Unit:406 × 1370×635 Panel:10 × 1660×750**	**Unit:(350+α) × 1370 × 635 Panel:10 × 1484 ×585**
Net weight	**kg**	**Unit:50 Panel:9**	**Unit:50 Panel:7**	**Unit:52 Panel:9**	**Unit:52 Panel:7**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve +Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 3			
Motor	**W**	**45 × 1, 90 × 1**		**50 × 1, 100 × 1**	
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 22**		**Hi: 34 Me: 31 Lo: 27**	
Available static pressure (at Me)	**Pa**	**Standard:50, Hi speed:80**			
Fresh air intake		Side or back			
Air filter Q'ty		Long life filter × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ9.52(3/8"),Gas line:φ19.05(3/4")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with VP25			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		**Silent panel, Canvas panel, Canvas duct**			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) Canvas panel is used in combination with following canvas duct
Canvas duct: HA01484

(4) The number "2",following the type of each model,represents"CE-marked model"especially for European Union, and for European nations which require CE marking.

(5) Indoor unit height of canvas specification type is higher than the other type for canvas duct portion.

(f) Medium static pressure ducted type (FDQM)

Model FDQMJ36HKXE3

Item \ Models		FDQMJ36HKXE3(3)
Nominal cooling capacity*1	**W**	**3600**
Nominal heating capacity*2	**W**	**4000**
Power source		**1 Phase 220/240V 50Hz**
Noise level	dB(A)	Hi: 34 Lo: 31
Exterior dimensions Height × Width × Depth	**mm**	**257 × 570 × 570**
Net weight	**kg**	**21**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing
Refrigerant control		Electronic Expansion Valve +Capillary tube
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1
Motor	**W**	**20×1**
Starting method		Line starting
Air flow(Standard)	**CMM**	**Hi: 7 Lo: 6.5**
Available static pressure (at Me)	**Pa**	**30**
Fresh air intake		Side
Air filter, Q'ty		–
Shock & vibration absorber		Rubber sleeve(for fan motor)
Insulation (noise & heat)		Polyurethane foam
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**
Room temperature control		Thermostat by electronics
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ6.35(1/4"), Gas line: ϕ12.7(1/2")**
Connecting method		**Flare piping**
Drain hose		Connectable with VP25
Insulation for piping		Necessary (both Liquid & Gas lines)
Accessories		**Mounting kit**
Optional parts		–
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8627
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "3", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(g) Satellite ducted type (FDUM)

Models FDUMJ36HKXE2, 45HKXE2

Item \ Models		FDUMJ36HKXE2[(3)]	FDUMJ45HKXE2[(3)]
Nominal cooling capacity*1	**W**	**3600**	**4500**
Nominal heating capacity*2	**W**	**4000**	**5000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 34 Me: 32 Lo: 29	Hi: 35 Me: 32 Lo: 29
Exterior dimensions Height × Width × Depth	**mm**	**299 × 750 × 635**	
Net weight	**kg**	**34**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	
Motor	**W**	**50×1**	**55×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 12 Me: 11 Lo: 10**	**Hi: 14 Me: 12 Lo: 11**
Available static pressure (at Me)	**Pa**	**Standard:50, Hi speed:85**	
Fresh air intake		Side	
Air filter, Q'ty		–	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: 6.35(1/4"),Gas line:φ12.7(1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8627
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDUMJ56HKXE2, 71HKXE2, 90HKXE2

Item \ Models		FDUMJ56HKXE2(3)	FDUMJ71HKXE2(3)	FDUMJ90HKXE2(3)
Nominal cooling capacity*1	**W**	**5600**	**7100**	**9000**
Nominal heating capacity*2	**W**	**6300**	**8000**	**10000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 35 Me: 32 Lo: 29	Hi: 35 Me: 32 Lo: 29	Hi: 36 Me: 33 Lo: 30
Exterior dimensions Height × Width × Depth	**mm**	**299 × 750 × 635**	**299 × 950 × 635**	
Net weight	**kg**	**34**	**40**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve +Capillary tube		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2		
Motor	**W**	**55×1**	**90×1**	**100×1**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 11**	**Hi: 18 Me: 16 Lo: 14**	**Hi: 20 Me: 18 Lo: 15**
Available static pressure (at Me)	**Pa**	**Standard:50, Hi speed:85**		
Fresh air intake		Side		
Air filter, Q'ty		–		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52(3/8"),Gas line:ϕ15.88(5/8")**		
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		–		
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**		

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

Models FDUMJ112HKXE2, 140HKXE2

Item \ Models		FDUMJ112HKXE2(3)	FDUMJ140HKXE2(3)
Nominal cooling capacity*1	**W**	**11200**	**14000**
Nominal heating capacity*2	**W**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 38 Me: 35 Lo: 32	Hi: 39 Me: 37 Lo: 34
Exterior dimensions Height × Width × Depth	**mm**	**350 × 1370 × 635**	
Net weight	**kg**	**57**	**59**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 3	
Motor	**W**	**45 × 1, 90 × 1**	**50 × 1, 100 × 1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 22**	**Hi: 34 Me: 31 Lo: 27**
Available static pressure (at Me)	**Pa**	**Standard:60, Hi speed:90**	**Standard:60, Hi speed:85**
Fresh air intake		Side	
Air filter, Q'ty		–	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ9.52(3/8"),Gas line:φ19.05(3/4")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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(h) Ceiling suspension type (FDE)

Models FDEJ36HKXE2B, 45HKXE2B

Item \ Models		FDEJ36HKXE2B(3)	FDEJ45HKXE2B(3)
Nominal cooling capacity*1	**W**	**3600**	**4500**
Nominal heating capacity*2	**W**	**4000**	**5000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 43 Me:40 Lo: 38	
Exterior dimensions Height × Width × Depth	**mm**	**184 ×1000 × 650**	
Net weight	**kg**	**22**	
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve + Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	
Motor	**W**	**40×1**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**	
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ6.35(1/4"), Gas line:φ12.7(1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP20	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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Models FDEJ56HKXE2B, 71HKXE2B

Item \ Models		FDEJ56HKXE2B(3)	FDEJ71HKXE2B(3)
Nominal cooling capacity*1	**W**	**5600**	**7100**
Nominal heating capacity*2	**W**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 43 Me:40 Lo: 38	Hi: 44 Me:40 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**184 × 1000 × 650**	**184 × 1260 × 650**
Net weight	**kg**	**22**	**27**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve + Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2	Centrifugal fan × 4
Motor	**W**	**40 × 1**	**25 × 2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 14 Me: 12 Lo: 10**	**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: φ9.52(3/8"), Gas line: φ15.88(5/8")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP20	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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Models FDEJ112HKXE2B, 140HKXE2B

Item \ Models		FDEJ112HKXE2B(3)	FDEJ140HKXE2B(3)
Nominal cooling capacity*1	**W**	**11200**	**14000**
Nominal heating capacity*2	**W**	**12500**	**16000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 49 Me:46 Lo: 42	Hi: 50 Me:47 Lo: 42
Exterior dimensions Height × Width × Depth	**mm**	**239 × 1260 × 650**	**239 × 1470 × 650**
Net weight	**kg**	**34**	**40**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve +Capillary tube	
Air handling equipment Fan type & Q'ty		Centrifugal fan × 3	Centrifugal fan × 4
Motor	**W**	**35×1 + 55×1**	**55×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 28 Me: 25 Lo: 22**	**Hi: 34 Me: 30 Lo: 26**
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52(3/8"), Gas line:ϕ19.05(3/4")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP20	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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(i) Wall mounted type (FDK)

Models FDKJ22HKXE2, 28HKXE2, 36HKXE2, 45HKXE2

Item \ Models		FDKJ22HKXE2(3)	FDKJ28HKXE2(3)	FDKJ36HKXE2(3)	FDKJ45HKXE2(3)
Nominal cooling capacity*1	**W**	**2200**	**2800**	**3600**	**4500**
Nominal heating capacity*2	**W**	**2500**	**3200**	**4000**	**5000**
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 40 Lo: 37	Hi: 42 Me:40 Lo: 37		Hi: 44 Me:41 Lo: 37
Exterior dimensions **Height × Width × Depth**	**mm**	**375 × 950 × 194**			
Net weight	**kg**	**19**			
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve + Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**30 × 1**			**35 × 1**
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 9 Lo: 8**	**Hi: 10 Me: 9 Lo: 8**		**Hi: 11.5 Me: 10 Lo: 8**
Fresh air intake		Not possible			
Air filter, Q'ty		Polypropylene net × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data **Refrigerant piping size**	**mm(in)**	**Liquid line:ϕ6.35(1/4"), Gas line:ϕ12.7(1/2")**			
Connecting method		**Flare piping**			
Drain hose		Connectable with I.D. 16mm			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		—			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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Models FDKJ56HKXE2, 71HKXE2

Item \ Model		FDKJ56HKXE2(3)	FDKJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**5600**	**7100**
Nominal heating capacity*2	**W**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**	
Noise level	dB(A)	Hi: 46 Me:43 Lo: 39	Hi: 47 Me:44 Lo: 40
Exterior dimensions Height × Width × Depth	**mm**	**375 ×1148 × 194**	**375 × 1436 × 194**
Net weight	**kg**	**20**	**22**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing	
Refrigerant control		Electronic Expansion Valve + Capillary tube	
Air handling equipment Fan type & Q'ty		Tangential fan ×1	Tangential fan ×2
Motor	**W**	**40×1**	**45×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 17 Me: 15 Lo: 13**	**Hi: 21 Me: 18 Lo: 15**
Fresh air intake		Not possible	
Air filter, Q'ty		Polypropylene net × 2(Washable)	
Shock & vibration absorber		Rubber sleeve(for fan motor)	
Insulation (noise & heat)		Polyurethane foam	
Operation control Operation switch		**Remote control switch (Optional:RCD-HKX-S-E2)**	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52(3/8"), Gas line:ϕ15.88(5/8")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with I.D. 16mm	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit**	
Optional parts		–	
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**	

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(j) Floor standing exposed type (FDFL)

Models FDFLJ28HKXE2, 45HKXE2, 71HKXE2

Item \ Model		FDFLJ28HKXE2(3)	FDFLJ45HKXE2(3)	FDFLJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**2800**	**4500**	**7100**
Nominal heating capacity*2	**W**	**3200**	**5000**	**8000**
Power source		**1 Phase 220/240V 50Hz**		
Noise level	dB(A)	Hi: 41 Me:38 Lo: 36	Hi: 43 Me:41 Lo: 40	
Exterior dimensions Height × Width × Depth	**mm**	**630 × 1196 × 225**		**630 × 1481 × 225**
Net weight	**kg**	**32**		**40**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing		
Refrigerant control		Electronic Expansion Valve + Capillary tube		
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2		
Motor	**W**	**30×1**	**40×1**	
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Hi: 12 Me: 11 Lo: 10**	**Hi: 14 Me: 12 Lo: 10**	**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Not possible		
Air filter, Q'ty		Polypropylene net × 2(Washable)		
Shock & vibration absorber		Rubber sleeve(for fan motor)		
Insulation (noise & heat)		Polyurethane foam		
Operation control Operation switch		**Remote control switch (Optional:RCD-HKXFL-E2)**		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ6.35(1/4"), Gas line:φ12.7(1/2")**		**Liquid line:φ9.52(3/8") Gas line:φ15.88(5/8")**
Connecting method		**Flare piping**		
Drain hose		Connectable with PT20A		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit**		
Optional parts		–		
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**		

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(k) Floor standing hidden type (FDFU)

Models FDFUJ28HKXE2, 45HKXE2, 56HKXE2, 71HKXE2

Item \ Model		FDFUJ28HKXE2(3)	FDFUJ45HKXE2(3)	FDFUJ56HKXE2(3)	FDFUJ71HKXE2(3)
Nominal cooling capacity*1	**W**	**2800**	**4500**	**5600**	**7100**
Nominal heating capacity*2	**W**	**3200**	**5000**	**6300**	**8000**
Power source		**1 Phase 220/240V 50Hz**			
Noise level	dB(A)	Hi: 41 Me:38 Lo: 36	Hi: 43 Me:41 Lo: 40		
Exterior dimensions Height × Width × Depth	**mm**	**630 × 1077 × 225**			**630 × 1362 × 225**
Net weight	**kg**	**25**			**32**
Refrigerant equipment Heat exchanger		Louver fins & inner grooved tubing			
Refrigerant control		Electronic Expansion Valve + Capillary tube			
Air handling equipment Fan type & Q'ty		Centrifugal fan × 2			
Motor	**W**	**30×1**	**40×1**		
Starting method		Line starting			
Air flow(Standard)	**CMM**	**Hi: 12 Me: 11 Lo: 10**	**Hi: 14 Me: 12 Lo: 10**		**Hi: 18 Me: 15 Lo: 12**
Fresh air intake		Not possible			
Air filter, Q'ty		Polypropylene net × 2(Washable)			
Shock & vibration absorber		Rubber sleeve(for fan motor)			
Insulation (noise & heat)		Polyurethane foam			
Operation control Operation switch		**Remote control switch (Optional:RCD-HKXFL-E2)**			
Room temperature control		Thermostat by electronics			
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat			
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ6.35(1/4"), Gas line:φ12.7(1/2")**		**Liquid line:φ9.52(3/8") Gas line:φ15.88(5/8")**	
Connecting method		**Flare piping**			
Drain hose		Connectable with PT20A			
Insulation for piping		Necessary (both Liquid & Gas lines)			
Accessories		**Mounting kit**			
Optional parts		–			
Outdoor units to be combined		**FDCP224HKXRE2A, 224HKXRE2V, 280HKXRE2A, 280HKXRE2V**			

Notes (1) The data are measured at the following conditions.

Operation \ Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27℃	19℃	35℃	24℃	ISO-T1,JIS B8616
Heating*2	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
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(2) Outdoor unit

Models FDCP224HKXRE2A, 280HKXRE2A

Item \ Models		FDCP224HKXRE2A(3)	FDCP280HKXRE2A(3)
Power source		**3 Phase 415V 50Hz**	
Nominal cooling capacity*1	**W**	**22400**	**28000**
Nominal heating capacity*2	**W**	**25000**	**31500**
Noise level	dB(A)	60	
Exterior dimensions Height × Width × Depth	**mm**	**1700 × 1350 × 600**	
Net weight	**kg**	**340**	**361**
Refrigerant equipment compressor type & Q' ty		RS5555HAV31	RS5570HAV31
Motor	**kW**	**5.5**	**7.5**
Starting method		Direct start	
Capacity control	%	100 ~ 22.0	
Crankcase heater	W	40	
Heat exchanger		Louver fines & inner grooved tubing	
Refrigerant control		Expansion Valve +Capillary tube	
Refrigerant		**R407C**	
Quantity	**kg**	**11**	
Refrigerant oil		**3.7 (MA32)**	**3.7 (MA32)**
Defrost control		MC controlled De-Icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	**W**	**100×2**	
Starting method		Direct start	
Air flow(Standard)	**CMM**	**175**	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Compressor overheat protection, overeurrent protection, power transformer overheating protection, abnormal high pressure protection	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ12.7(1/2") Intake gas line:ϕ25.4(1") Discharge gas line: ϕ19.05(3/4")**	**Liquid line:ϕ12.7(1/2") Intake gas line:ϕ28.58(11/8") Discharge gas line: ϕ19.05(3/4")**
Connecting method		**Brazing**	
Drain		Hole for drain(ϕ20 × 6pcs)	
Insulation for piping		Necessary (both Liquid &Gas lines)	
Accessories		Discharge gas side connection piping (for service valve and back direction connections), intake gas side connection piping (for service valve and back direction connections)	
Indoor units to be combined		**FDTJ28, 36, 45, 56, 71, 90, 112, 140 FDTWJ28, 45, 56, 71, 90, 112, 140 FDTQJ22, 28, 36 FDTSJ45, 71 FDRJ45, 56, 71, 90, 112, 140 FDQMJ36 FDUMJ36, 45, 56, 71, 90, 112, 140**	**FDEJ36, 45, 56, 71, 112, 140 FDKJ22, 28, 36, 45, 56, 71 FDFLJ28, 45, 71 FDFUJ28, 45, 56, 71**

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-TI.

(2) The refrigerant quantity in the connecting pipe is not included Charge it additionally at the site.

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(4) When an individual flow divide controller is used a pipe part set is required.

Flow divide controller part No. list

Type		Part No. FDCP224,280
Individual flow divide controller		HPFD01R-E
Central flow divide controller	**For 2 units (2 divisions)**	HPFD02R-E
	For 4 units (4 divisions)	HPFD04R-E
	For 6 units (6 divisions)	HPFD06R-E

Type	Part No. FDCP224,280
Division [For 2 pipes (Used at the same mode of cooling/heating)]	DIS-1KXR2-E
Horizontal division (for 3 pipes)	DIS-1KXR3-E
Vertical division (for 3 pipes)	DIS-V1KXR3-E

Models FDCP224HKXRE2V, 280HKXRE2V

Item \ Models		FDCP224HKXRE2V(3)	FDCP280HKXRE2V(3)
Power source		**3 Phase 380V 50HZ**	
Nominal cooling capacity*1	**W**	**22400**	**28000**
Nominal heating capacity*2	**W**	**25000**	**31500**
Noise level	dB(A)	60	
Exterior dimensions Height × Width × Depth	**mm**	**1700 × 1350 × 600**	
Net weight	**kg**	**340**	**361**
Refrigerant equipment compressor type & Q' ty		RS5555HAV31	RS5570HAV31
Motor	**kW**	**5.5**	**7.5**
Starting method		Direct start	
Capacity control	%	100 ~ 22.0	
Crankcase heater	W	40	
Heat exchanger		Louver fines & inner grooved tubing	
Refrigerant control		Expansion Valve +Capillary tube	
Refrigerant		**R407C**	
Quantity	**kg**	**11**	
Refrigerant oil		**3.7 (MA32)**	**3.7 (MA32)**
Defrost control		MC controlled De-Icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	**W**	**100×2**	
Starting method		Direct start	
Air flow(Standard)	**CMM**	**175**	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Compressor overheat protection, overeurrent protection, power transformer overheating protection, abnormal high pressure protection	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:φ12.7(1/2") Intake gas line:φ25.4(1") Discharge gas line: φ19.05(3/4")**	**Liquid line:φ12.7(1/2") Intake gas line:φ28.58(11/8") Discharge gas line: φ19.05(3/4")**
Connecting method		**Brazing**	
Drain		Hole for drain(φ20 × 6pcs)	
Insulation for piping		Necessary (both Liquid &Gas lines)	
Accessories		Discharge gas side connection piping (for service valve and back direction connections), intake gas side connection piping (for service valve and back direction connections)	
Indoor units to be combined		**FDTJ28, 36, 45, 56, 71, 90, 112, 140 FDTWJ28, 45, 56, 71, 90, 112, 140 FDTQJ22, 28, 36 FDTSJ45, 71 FDRJ45, 56, 71, 90, 112, 140 FDQMJ36 FDUMJ36, 45, 56, 71, 90, 112, 140**	**FDEJ36, 45, 56, 71, 112, 140 FDKJ22, 28, 36, 45, 56, 71 FDFLJ28, 45, 71 FDFUJ28, 45, 56, 71**

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-TI.

(2) The refrigerant quantity in the connecting pipe is not included Charge it additionally at the site.

(3) The number "2", following the type of each model, represents"CE-marked model" especially for European Union, and for European nations which require CE marking.

(4) When an individual flow divide controller is used a pipe part set is required.

Flow divide controller part No. list

Type		Part No. FDCP224,280
Individual flow divide controller		HPFD01R-E
Central flow divide controller	**For 2 units (2 divisions)**	HPFD02R-E
	For 4 units (4 divisions)	HPFD04R-E
	For 6 units (6 divisions)	HPFD06R-E

Type	Part No. FDCP224,280
Division [For 2 pipes (Used at the same mode of cooling/heating)]	DIS-1KXR2-E
Horizontal division (for 3 pipes)	DIS-1KXR3-E
Vertical division (for 3 pipes)	DIS-V1KXR3-E

(3) Operation chart

Since the Multi KXR series air conditioner units are free multitype to which the indoor units of different capacity and different model can be combined, the operation characteristics of all combinations are very complicated, therefore only the individual operation characteristics of indoor and outdoor units are shown. For the combined operation characteristics, calculate them with the method shown in the next page.

(a) Operating characteristic of outdoor unit

(415 V)

Item \ Models		FDCP224HKXRE2A	FDCP280HKXRE2A
Cooling power consumption	kW	10.2	13.4
Heating power consumption		8.4	11.4
Cooling running current	A	15.8	20.0
Heating running current		12.8	17.6
Inrush current (MAX.)	A	48	70
Cooling power factor	%	90	93
Heating power factor		91	90

(380 V)

Item \ Models		FDCP224HKXRE2V	FDCP280HKXRE2V
Cooling power consumption	kW	10.2	13.4
Heating power consumption		8.4	11.4
Cooling running current	A	17.1	22.0
Heating running current		13.7	19.3
Inrush current (MAX.)	A	48	70
Cooling power factor	%	91	93
Heating power factor		93	90

Note (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 “UNITARY AIR-CONDITIONERS”

(b) Operating characteristic of indoor unit

FDT Series

(220 V/240 V)

Models	FDT Series							
Item	28	36	45	56	71	90	112	140
Power consumption (kW)	0.09/0.10		0.10/0.12	0.10/0.12		0.11/0.13	0.17/0.20	0.21/0.24
Running consumption (A)	0.40/0.44		0.45/0.49	0.47/0.50		0.50/0.55	0.75/0.81	0.93/1.02

FDTW Series

(220 V/240 V)

Models	FDTW Series						
Item	28	45	56	71	90	112	140
Power consumption (kW)	0.09/0.10			0.10/0.11	0.13/0.16	0.20/0.24	0.23/0.27
Running consumption (A)	0.41/0.42			0.40/0.44	0.60/0.65	0.90/0.98	1.03/1.13

FDTQ, FDTS Series

(220 V/240 V)

Models	FDTQ Series(Direct blow panel)			FDTQ Series(Duct panel)			FDTS Series	
Item	22	28	36	22	28	36	45	71
Power consumption (kW)	0.045/0.050			0.050/0.055			0.10/0.11	0.12/0.15
Running current (A)	0.21/0.22			0.23/0.24			0.43/0.46	0.58/0.63

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 “UNITARY AIR-CONDITIONERS”
(2) The values shown in the above table are common to both cooling and heating operations.

FDR Series

(220 V/240 V)

Item \ Models	FDR Series					
	45	56	71	90	112	140
Power consumption (kW)	0.14/0.16		0.15/0.17	0.16/0.19	0.24/0.28	0.28/0.32
Running current (A)	0.63/0.67		0.68/0.71	0.73/0.79	1.07/1.17	1.28/1.32

FDQM, FDUM Series

(220 V/240 V)

Item \ Models	FDQM	FDUM Series						
	36	36	45	56	71	90	112	140
Power consumption (kW)	0.050/0.055	0.11/0.13	0.14/0.16		0.15/0.17	0.16/0.19	0.24/0.28	0.28/0.32
Running current (A)	0.23/0.24	0.51/0.56	0.63/0.67		0.68/0.71	0.73/0.79	1.07/1.17	1.28/1.32

FDE Series

(220 V/240 V)

Item \ Models	FDE Series					
	36	45	56	71	112	140
Power consumption (kW)	0.10/0.11			0.12/0.15	0.20/0.24	0.24/0.29
Running current (A)	0.43/0.46			0.58/0.63	0.90/0.98	1.10/1.20

FDK, FDFL, FDFU Series

(220 V/240 V)

Item \ Models	FDK Series						FDFL, FDFU Series		
	22	28	36	45	56	71	28	45, 56	71
Power consumption (kW)	0.05/0.06			0.06/0.07	0.08/0.09	0.09/0.11	0.09/0.10	0.09/0.10	0.09/0.10
Running current (A)	0.26/0.28			0.31/0.33	0.36/0.39	0.41/0.48	0.41/0.42	0.40/0.41	0.40/0.41

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"
(2) The values shown in the above table are common to both cooling and heating operations.

(c) Calculation of total operation characteristics

Since the operation characteristics of series Multi-KXR depend on combination of indoor unit, calculate the total operation characteristics of the system by using the formulas below according to specifications of each indoor unit or outdoor unit.

1) Total power consumption

Total power consumption (kW) = Power consumption of outdoor unit + Σ (Power consumption of indoor unit)

2) Total running current

Total running current (A) = Running current of outdoor unit + [Σ (Running current) × 2/3]

3) Total power factor

Total power factor (%) = [Total power consumption (W) / $\sqrt{3}$ × Total running current (A) × Power source] × 100

Total operation characteristics = Operation characteristic value of outdoor unit + Operation characteristic value of indoor unit

[Example]

(Conditions) Operation Voltage ········ Indoor unit: 220 V, 50 Hz
Outdoor unit: 380 V, 50 Hz
Operation mode ··········· Cooling and Heating
Unit······························ Outdoor unit: FDCP224HKXRE2V × 1 unit
Indoor unit: FDTJ71HKXE2 × 2 units
FDTJ45HKXE2 × 2 units

Operation characteristics of each unit (Cooling/Heating)

Item \ Models	FDCP224HKXRE2V	FDTJ71HKXE2	FDTJ45HKXE2
Power consumption (kW)	10.2/8.4	0.10/0.10	0.10/0.10
Running current (A)	17.1/13.7	0.47/0.47	0.45/0.45

① Total power consumption (kW)

(Cooling) $10.2 + (0.10 \times 4) = 10.6$ (kW)

(Heating) $8.4 + (0.10 \times 4) = 8.8$ (kW)

② Total running current (A)

(Cooling) $17.1 + (0.47 \times 2 + 0.45 \times 2) \times \frac{2}{3} \fallingdotseq 18.3$ (A)

(Heating) $13.7 + (0.47 \times 2 + 0.45 \times 2) \times \frac{2}{3} \fallingdotseq 14.9$ (A)

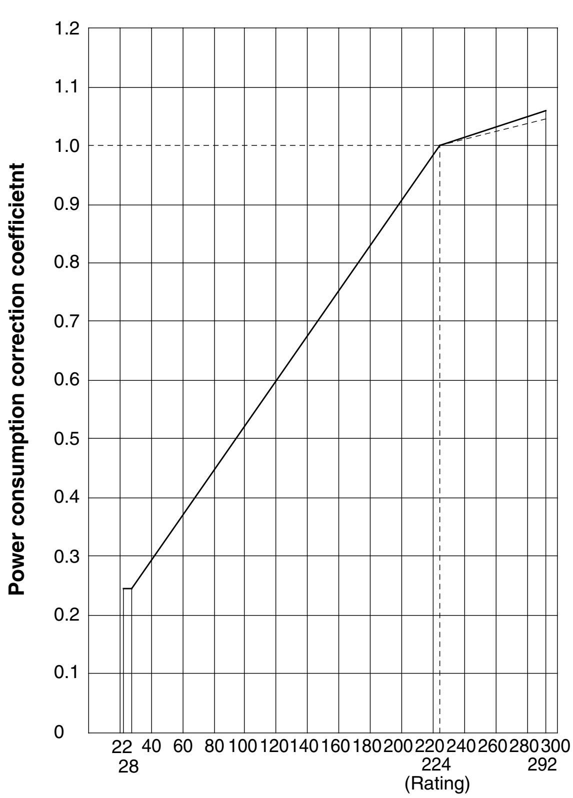
③ Total power factor (%)

(Cooling) $\frac{10.6 \times 1000}{\sqrt{3} \times 18.3 \times 380} \times 100 \fallingdotseq 88$ %

(Heating) $\frac{8.4 \times 1000}{\sqrt{3} \times 14.9 \times 380} \times 100 \fallingdotseq 86$ %

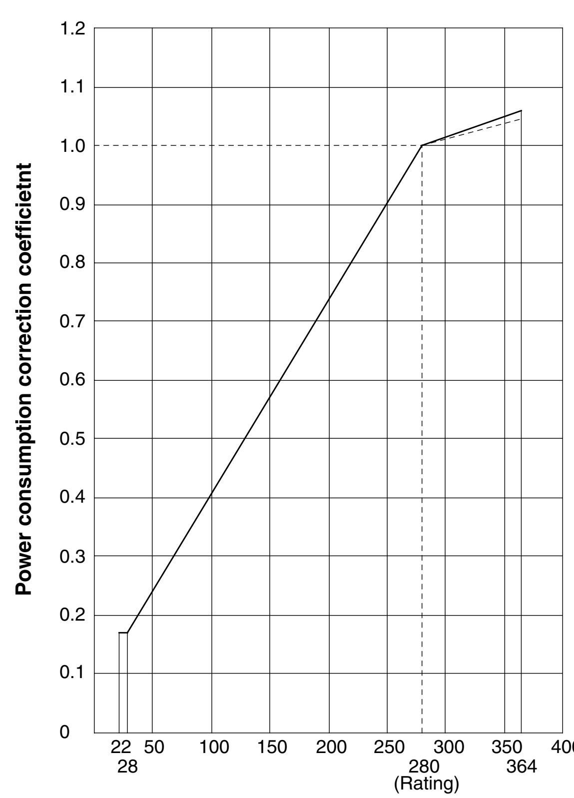
- **Correction factor of compressor power consumption**

Model FDCP224HKXRE2A, 224HKXRE2V



Total capacity of indoor units operating simulataneously

Model FDCP280HKXRE2A, 280HKXRE2V



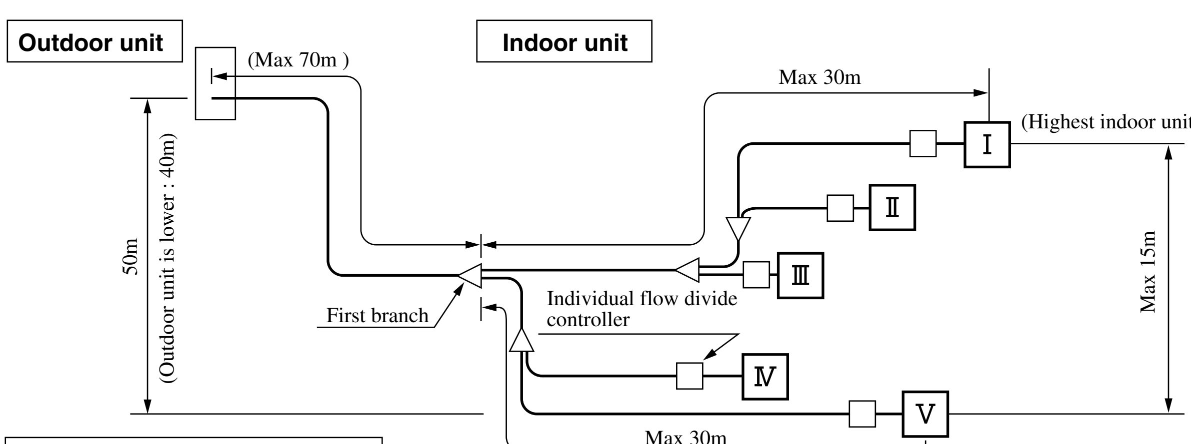
Total capacity of indoor units operating simulataneously

2.2.2 Range of usage & limitations

Item		FDCP224HKXRE2A 224HKXRE2V	FDCP280HKXRE2A 280HKXRE2V
Indoor intake air temperature (Upper, lower limits)		Refer to the Selection chart.	
Outdoor air temperature (Upper, lower limits)			
Indoor units that can be used in combination	Number of connected units	1 to 12 units	1 to 16 units
	Total capacity	110 ~ 292	132 ~ 364
Single direction piping lenght		Indoor unit MAX. 100m	
Outdoor unit to first branching (main piping)		Max. 70m	
Piping length after the first branching		Max. 30m	
Difference in height between indoor and outdoor units	When above outdoor unit	MAX. 50m	
	When below outdoor unit	MAX. 40m	
Difference in height between indoor units		MAX. 15m	
Indoor unit atmosphere (behind ceiling) temperature and humidity		Dew point temperature 28 ℃ or less, relative humidity 80% or less	
Compressor stop/start frequency	1 cycle time	6 min or more(from stop to stop or from start to start)	
	Stop time	3 min or more	
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage	
	Voltage drop during start	Within ±15% of rated voltage	
	Interval unbalance	Within ± 3% of rated voltage	

Allowable length of refrigerant piping, Height difference between indoor and outdoor unit

◆Individual flow divide controller

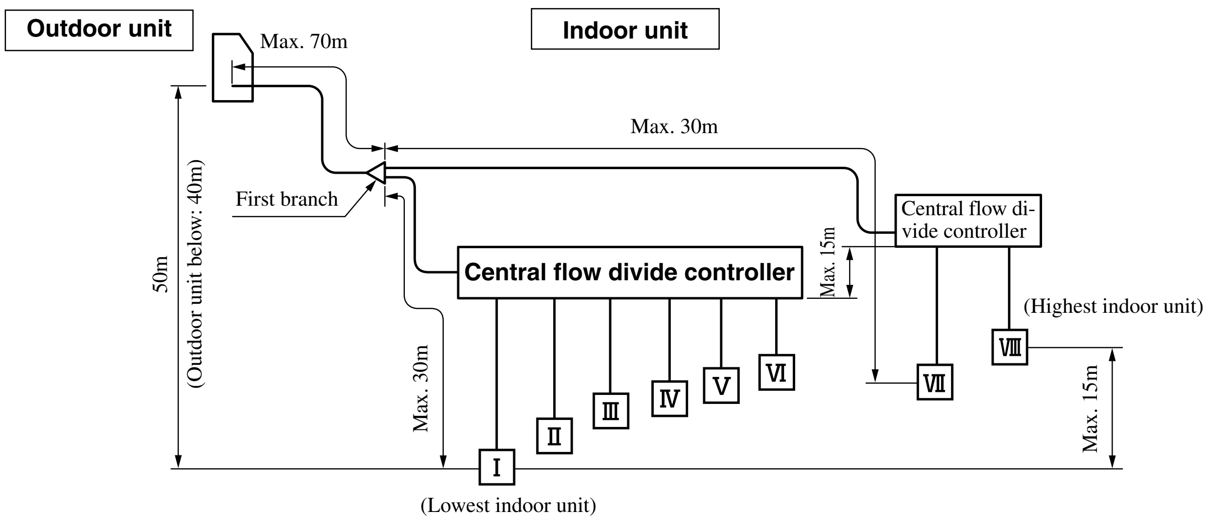


Permissible lengths of piping

- Between the outdoor unit and first branch (main piping): Max 70m (actual length)
- Between the first branch and each indoor unit : Max 30m (each indoor unit) (actual length)

Note (1) The indoor unit and individual flow divide controller positions should be within the range of the reach of the connections of the wires that come with the individual flow divide contoroller

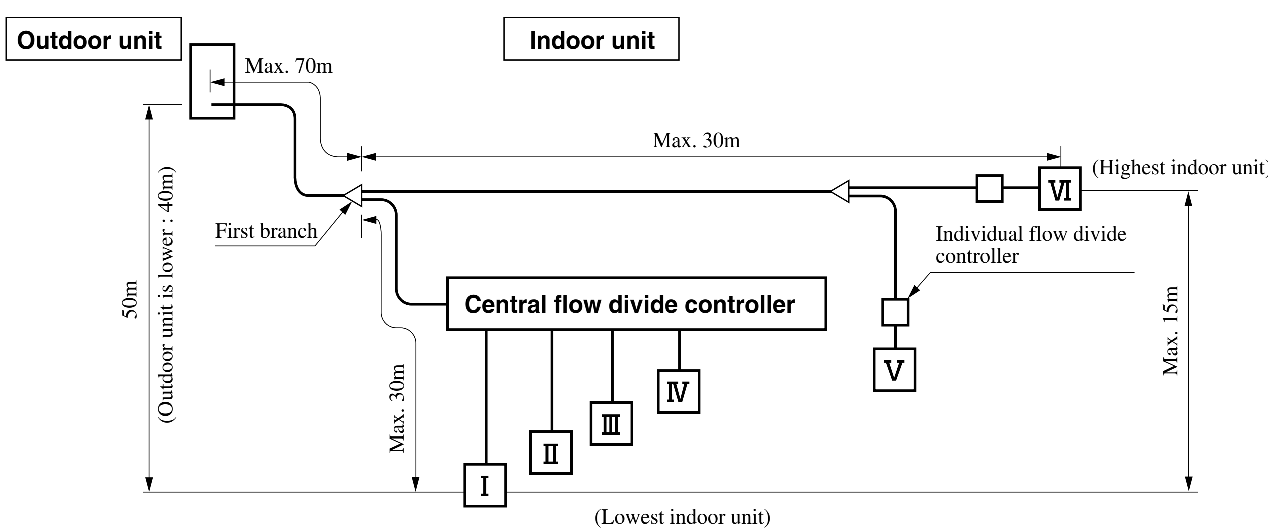
◆Central flow divide system



Permissible lengths of piping

- From outdoor unit to first branch or to central flow divide controller (if first branch does not exist): Max. 70m [real length]
- From first branch to each indoor unit: Max. 30m (each indoor unit) [real length]
- From central flow divide controller to central flow divide controller: within 15m [height]

◆Mixed central/individual flow divide system

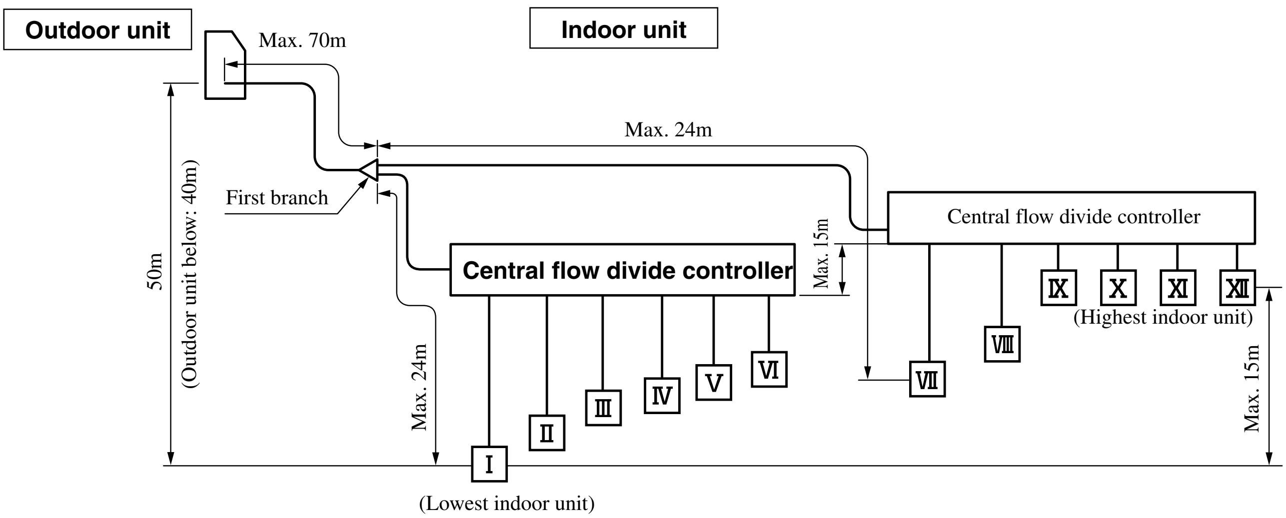


Permissible lengths of piping

- From outdoor unit to first branch or to central flow divide controller (if first branch does not exist): Max. 70m [real length]
- From first branch to each indoor unit: Max. 30m (each indoor unit) [real length]
- From central flow divide controller to central flow divide controller: within 15m [height]

When nine and more indoor units are connected (Central flow divider controller only)

◆Central flow divide system



Permissible lengths of piping

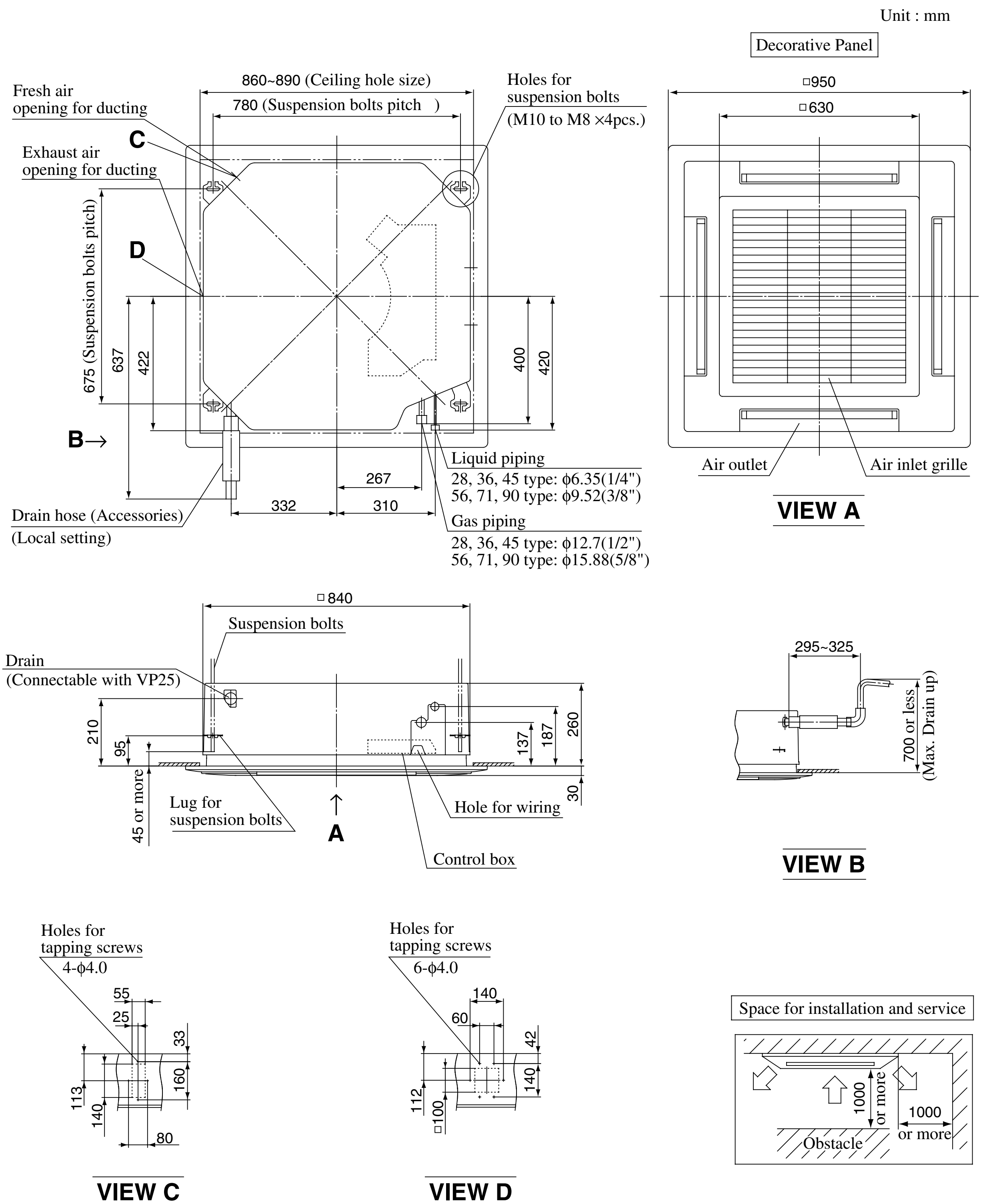
- From outdoor unit to first branch or to central flow divide controller (if first branch does not exist): Max. 70m [real length]
- From first branch to each indoor unit: Max. 24m (each indoor unit) [real length]
- From central flow divide controller to central flow divide controller: within 15m [height]

2.2.3 Exterior dimensions

(1) Indoor unit

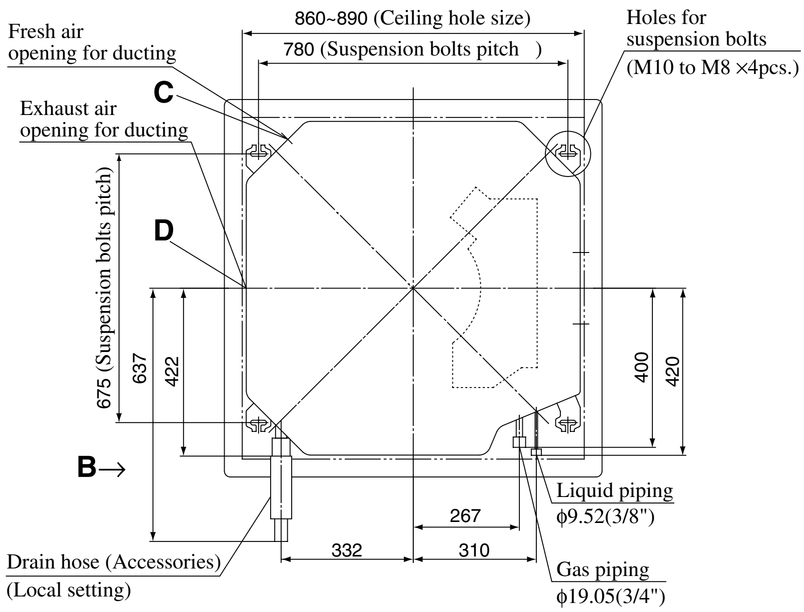
(a) Ceiling recessed type (FDT)

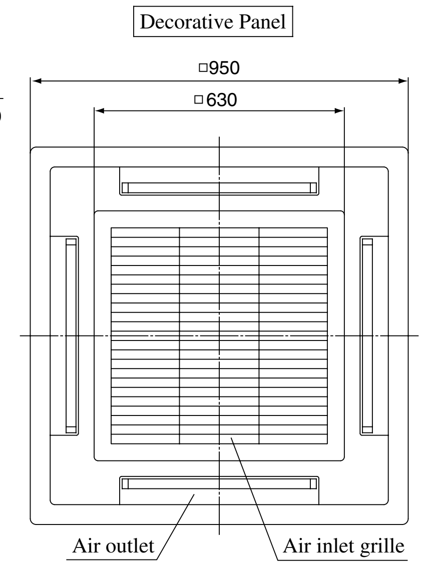
Models FDTJ28HKXE2, 36HKXE2, 45HKXE2, 56HKXE2, 71HKXE2, 90HKXE2



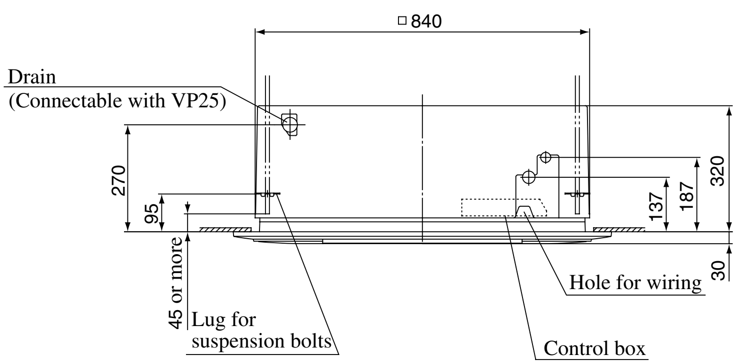
Models FDTJ112HKXE2, 140HKXE2

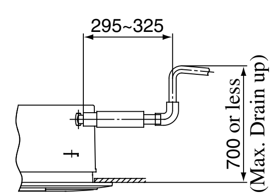
Unit : mm



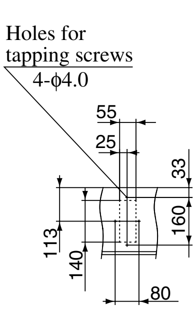


VIEW A

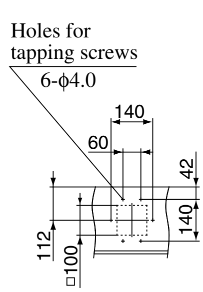




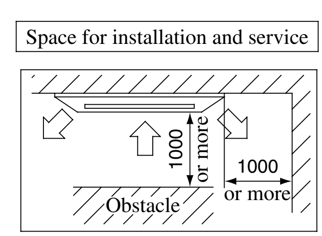
VIEW B



VIEW C



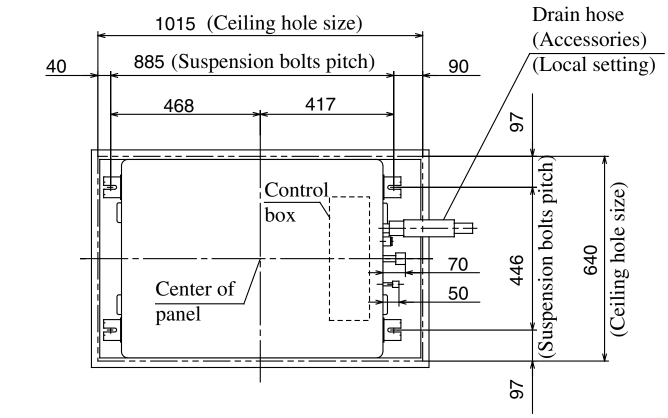
VIEW D

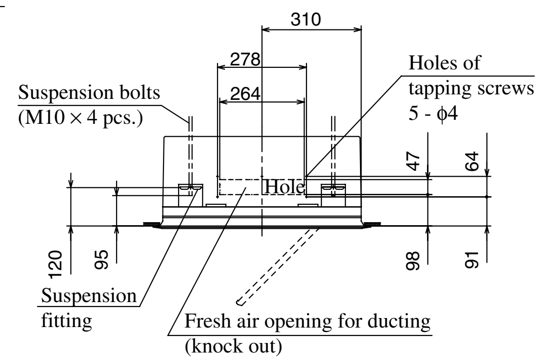


(b) 2-way outlet ceiling recessed type (FDTW)

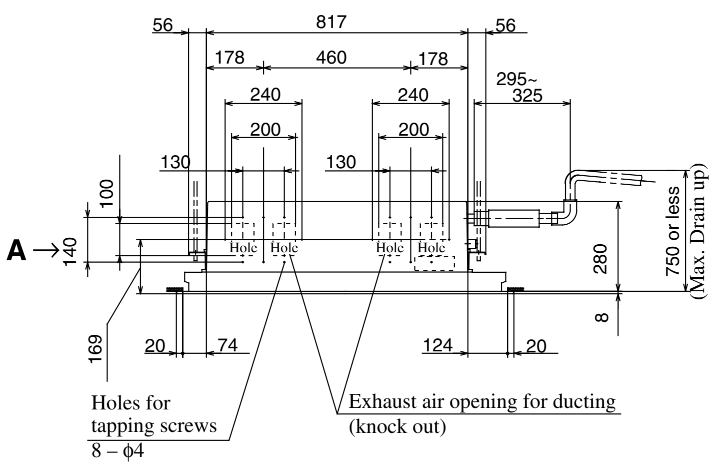
Models FDTWJ28HKXE2B, 45HKXE2B, 56HKXE2B

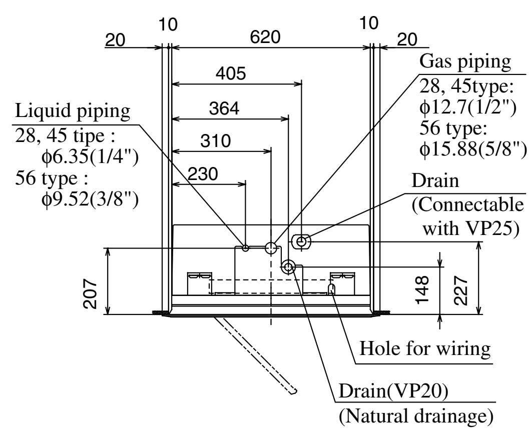
Unit : mm



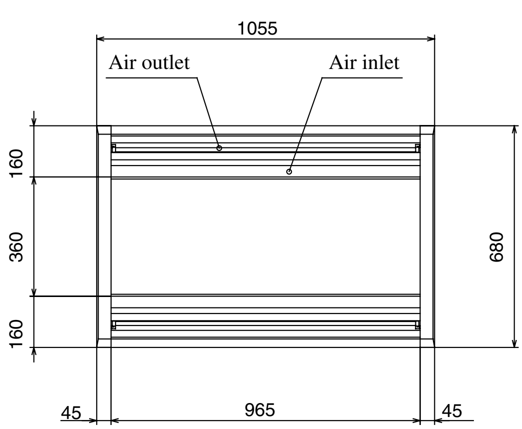


VIEW A

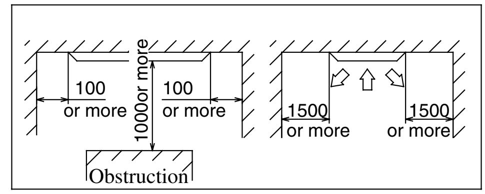




Decorative Panel

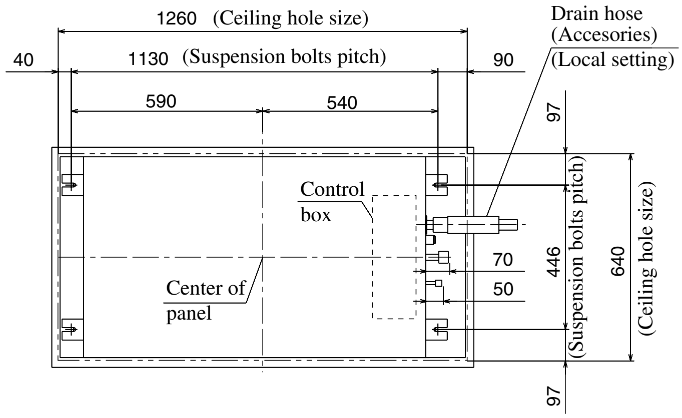


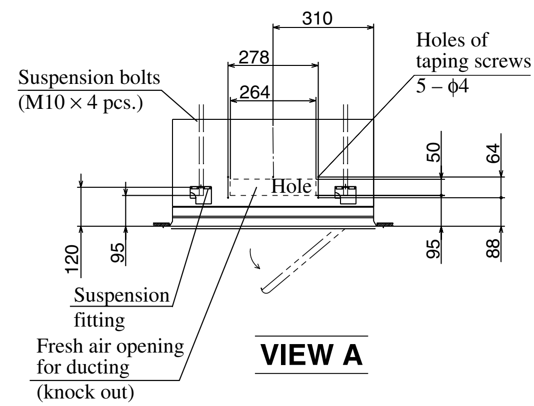
Space for installation and service

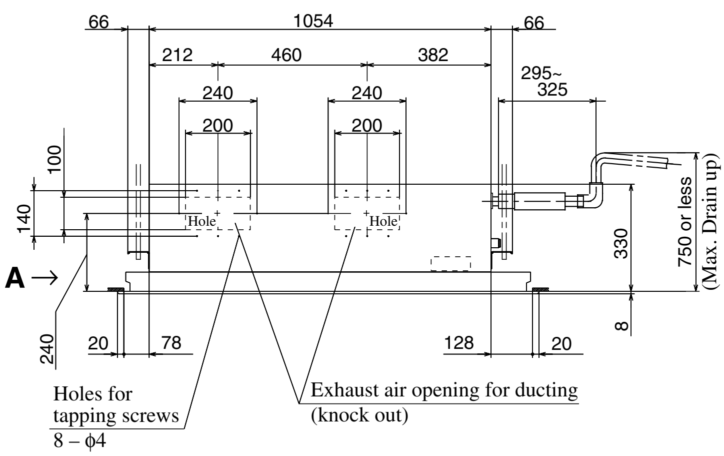


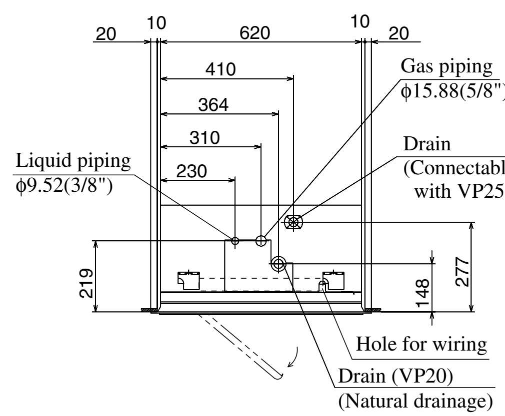
Models FDTWJ71HKXE2B, 90HKXE2B

Unit : mm

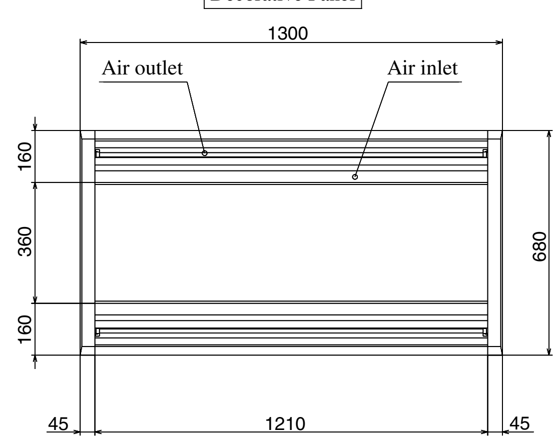




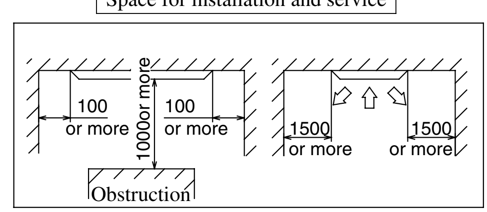




Decorative Panel

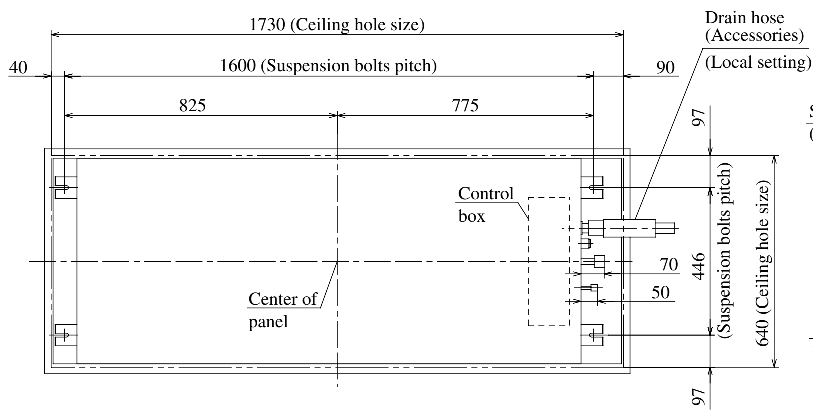


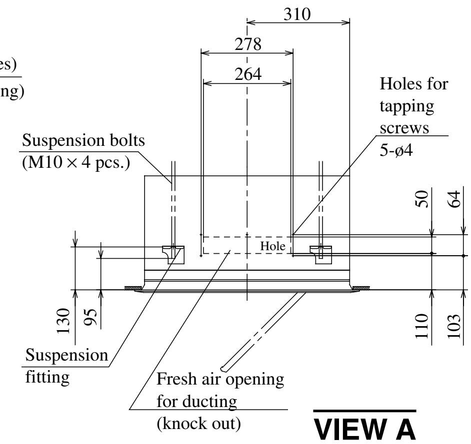
Space for installation and service



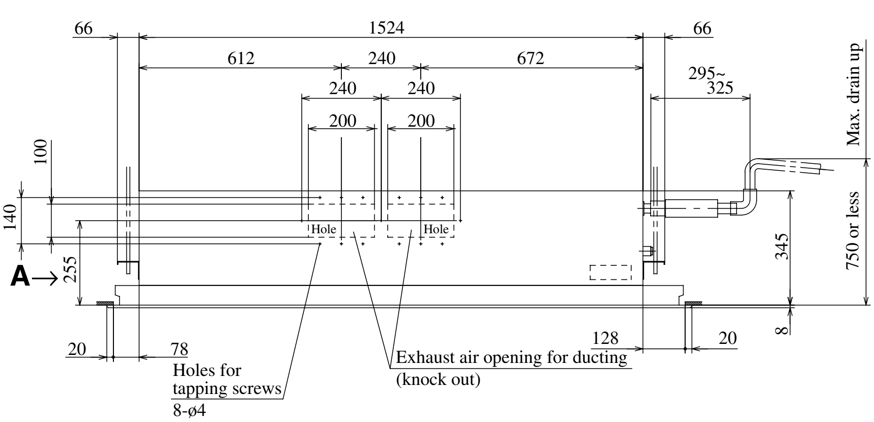
Models FDTWJ112HKXE2B, 140HKXE2B

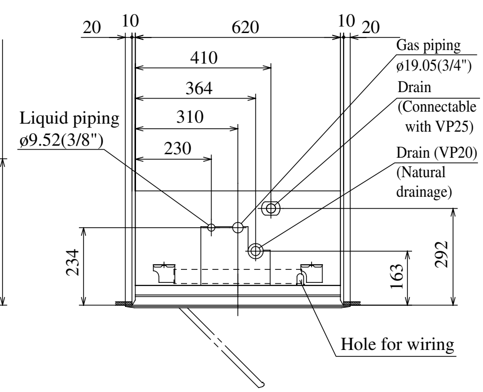
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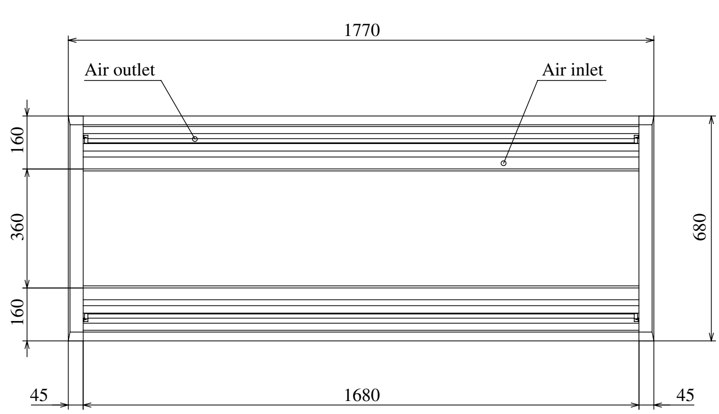




VIEW A

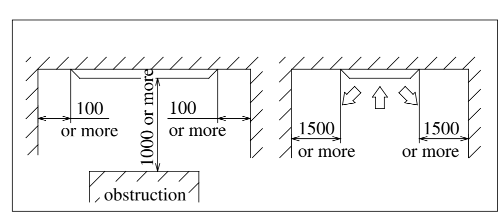






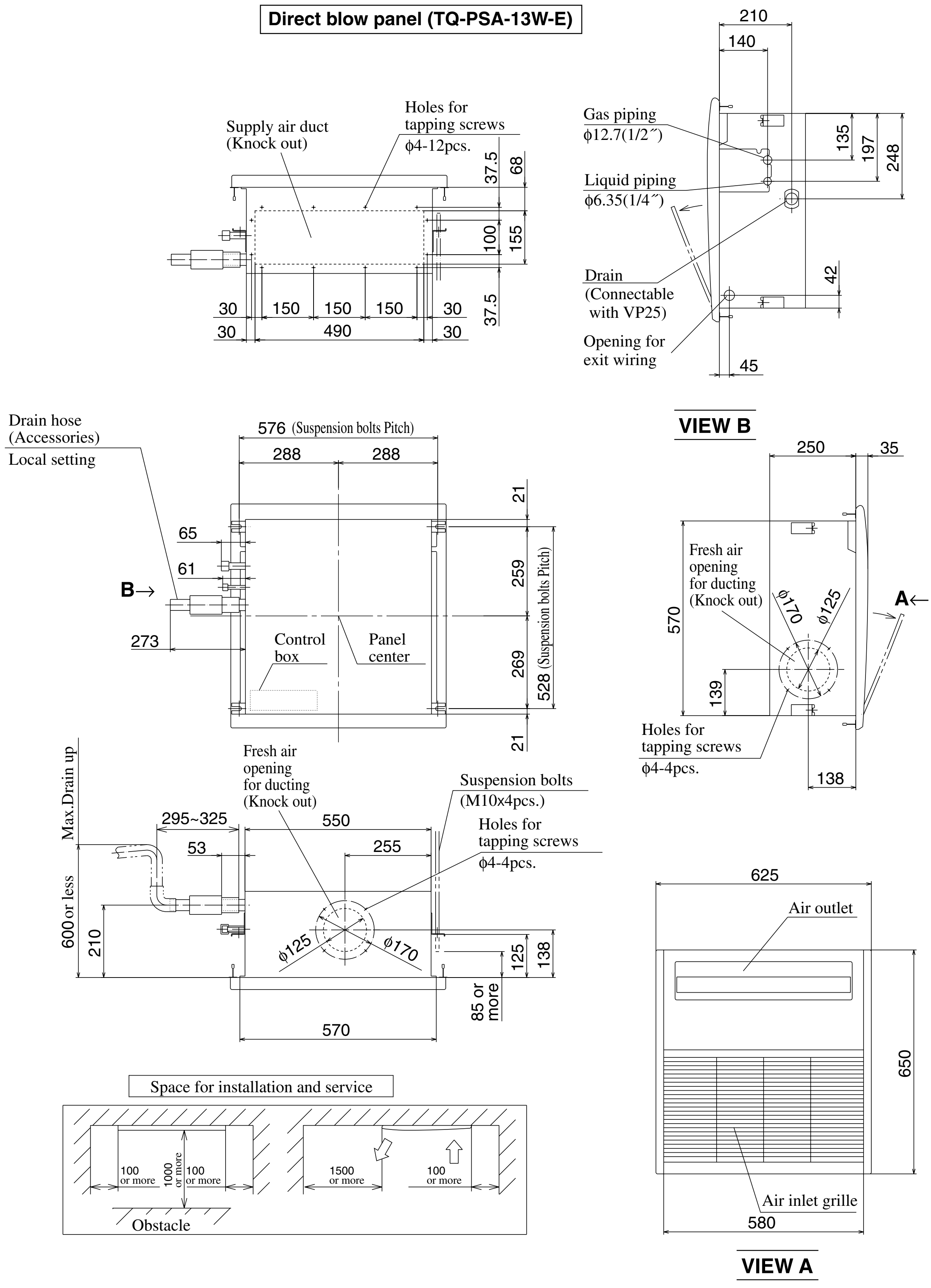
Decorative Panel

Space for installation and service

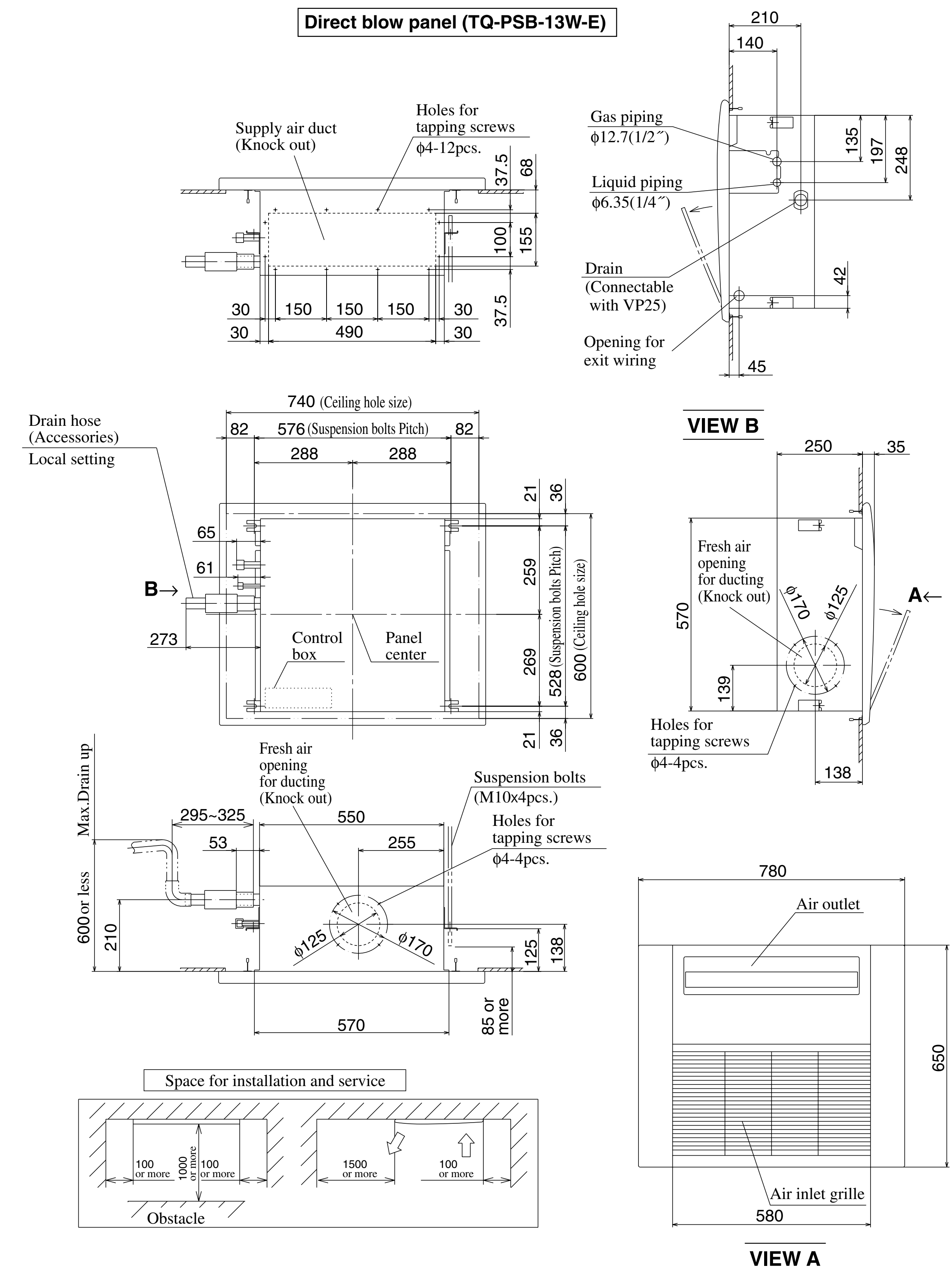


(c) Ceiling recessed single air supply port type (FDTQ)

Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3



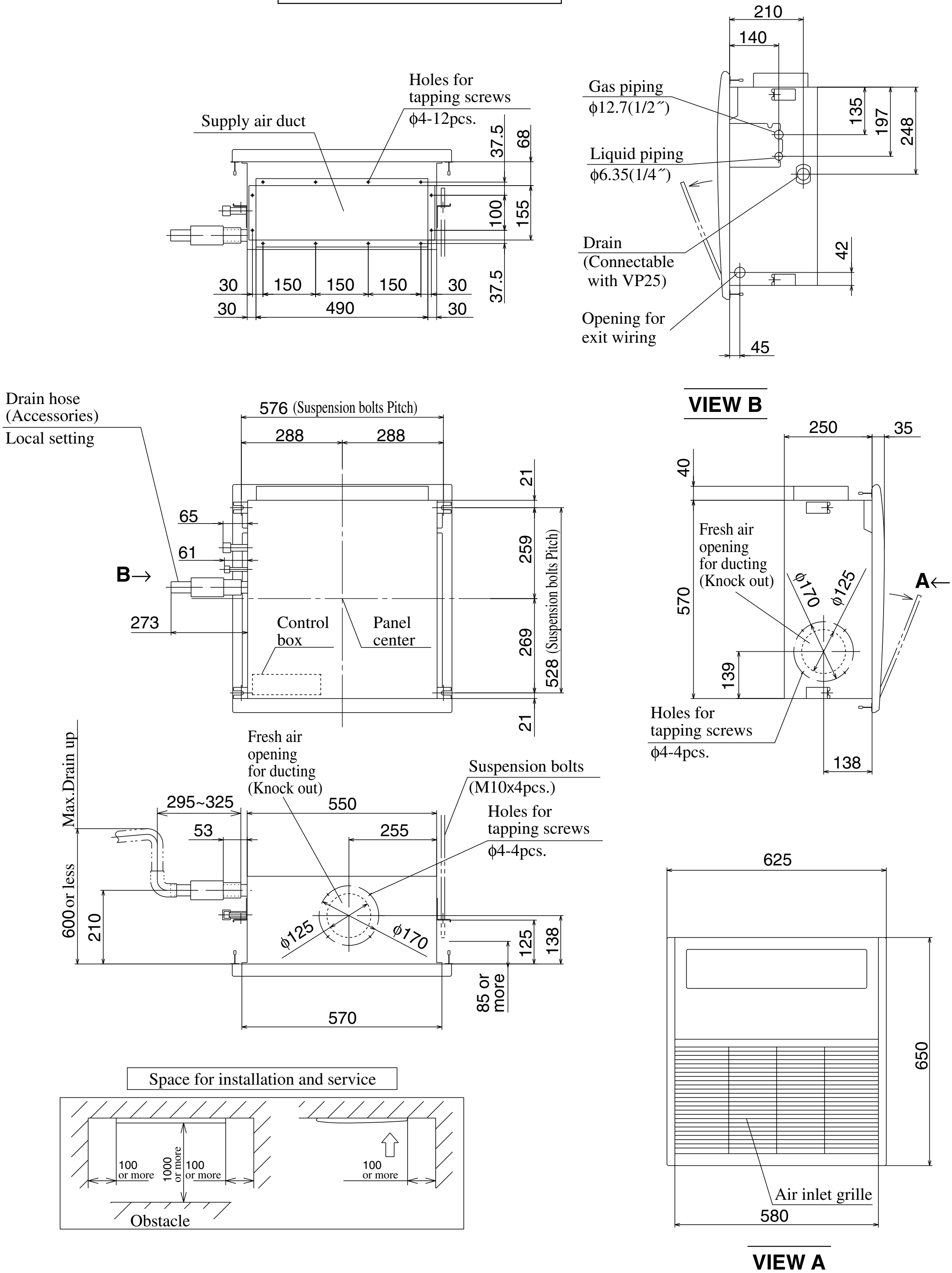
Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3



● **When modified to the Duct panel type on site.**

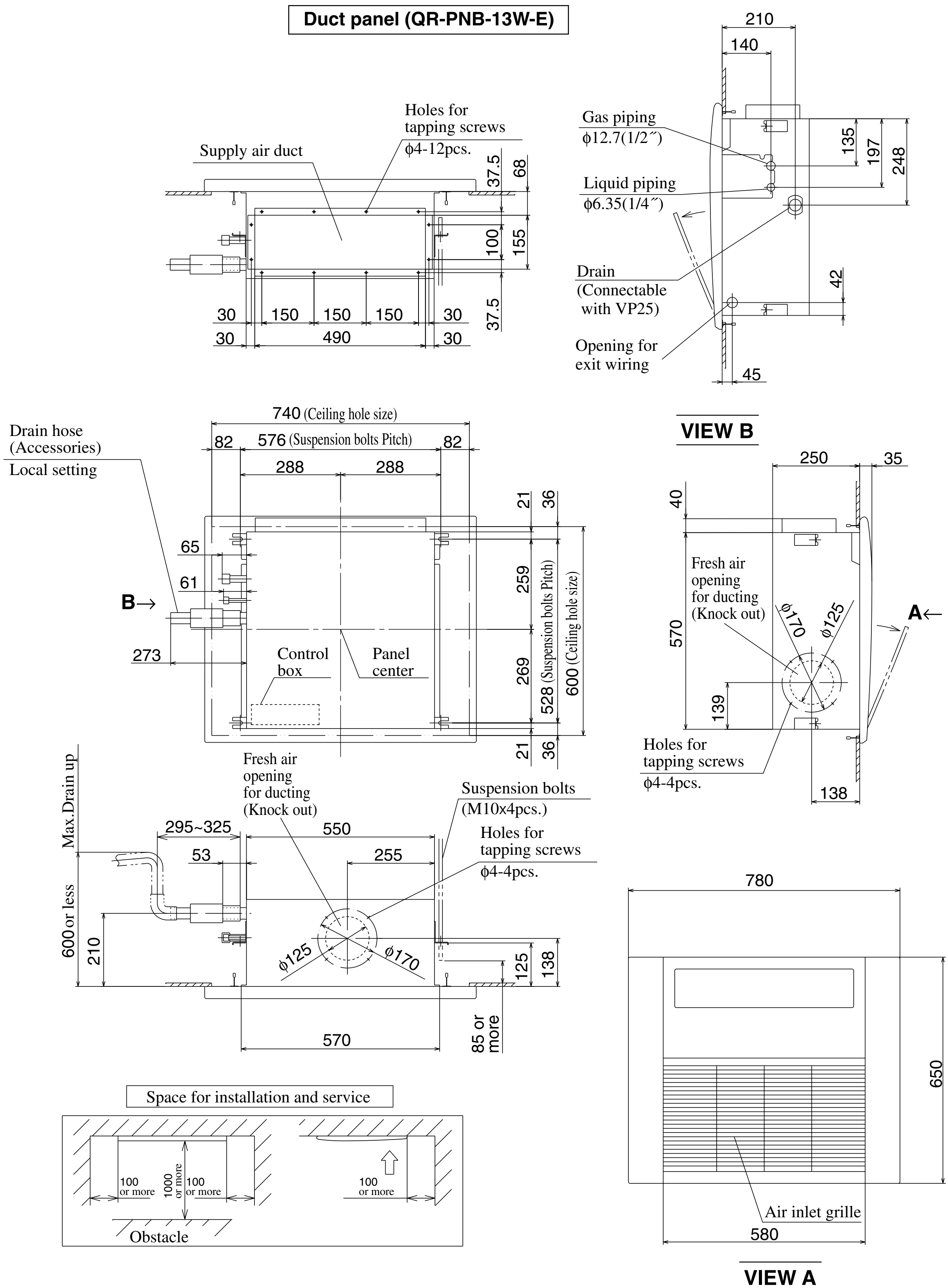
Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3

Duct panel (QR-PNA-13W-E)



● When modified to the Duct Cassetteria type on site.

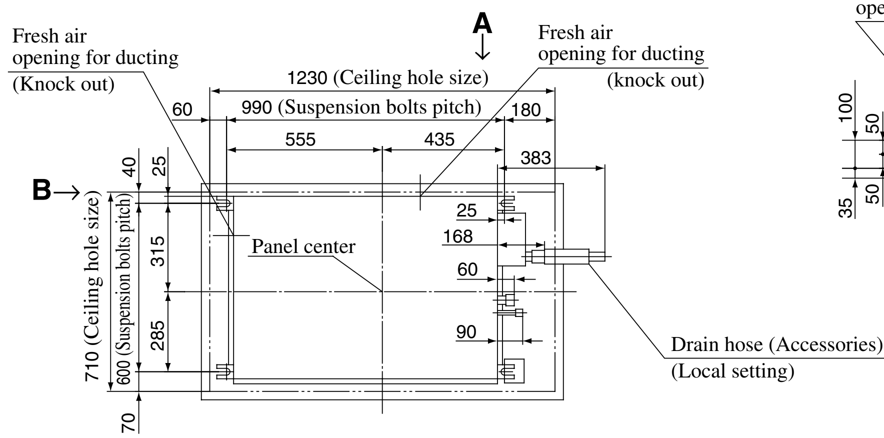
Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3

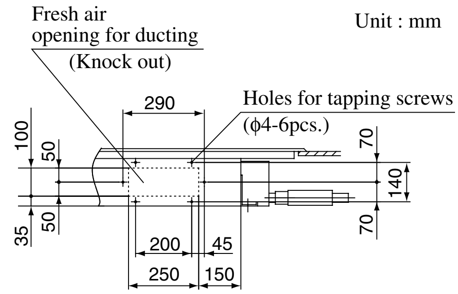


(d) 1-way outlet ceiling recessed type (FDTS)

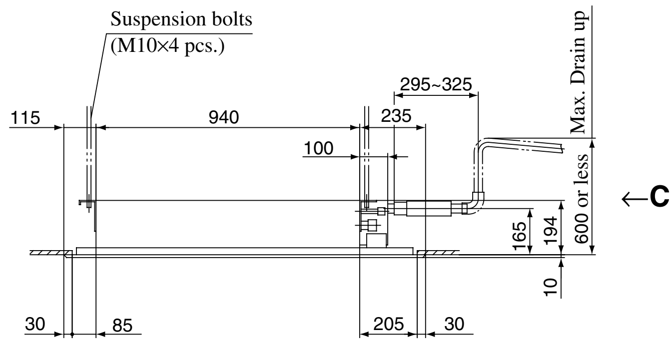
Model FDTSJ45HKXE2B

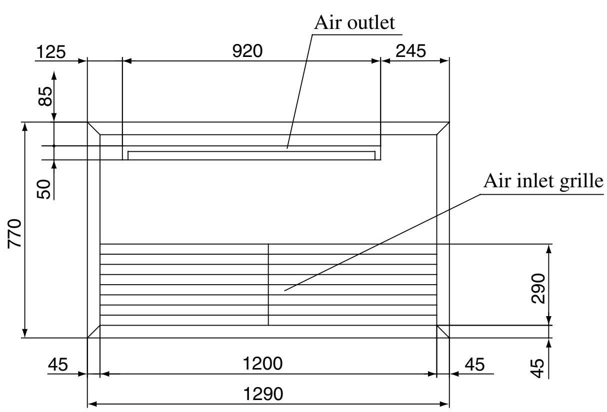
Unit : mm



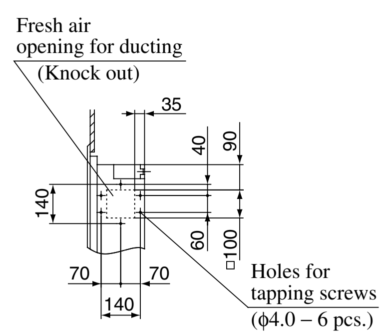


VIEW A

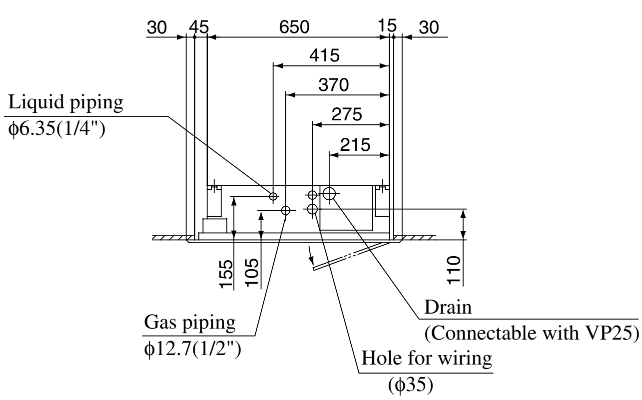




Decorative Panel

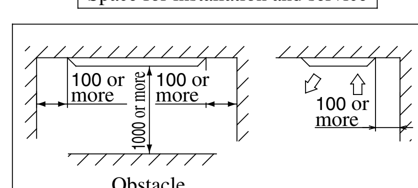


VIEW B



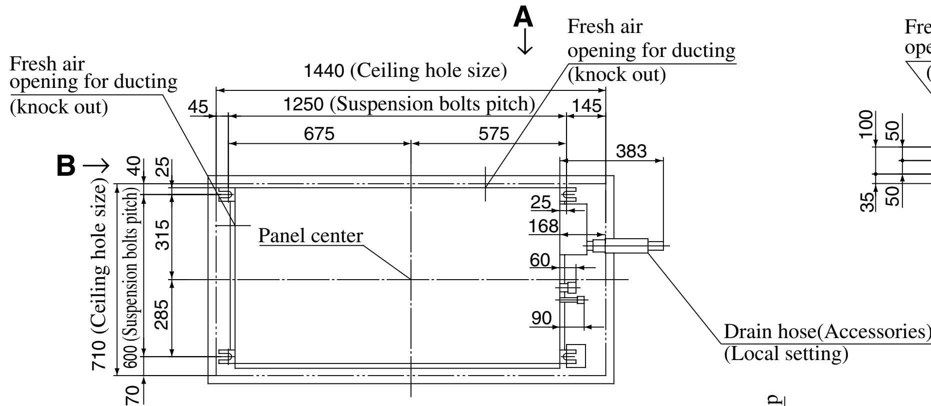
VIEW C

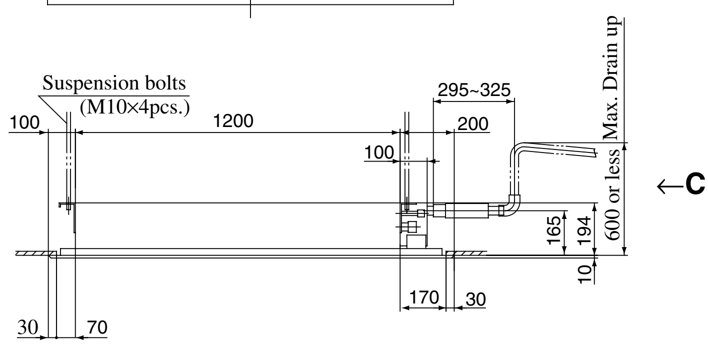
Space for installation and service

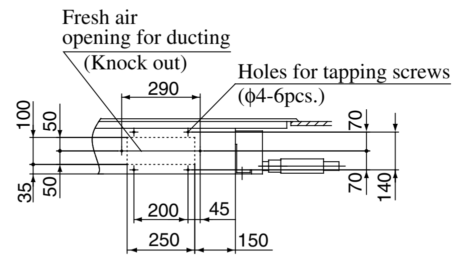


Model FDTSJ71HKXE2B

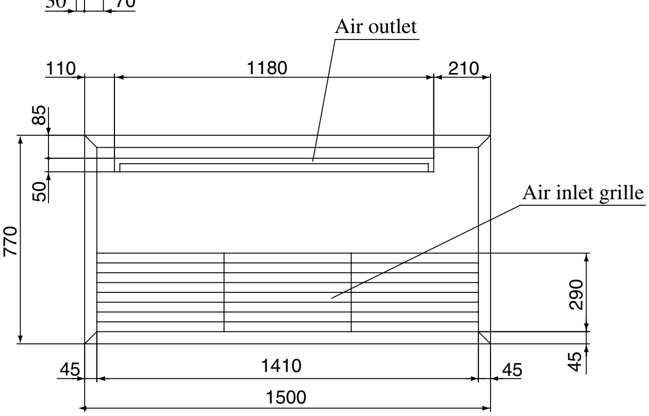
Unit : mm



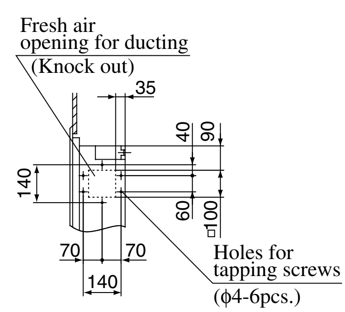




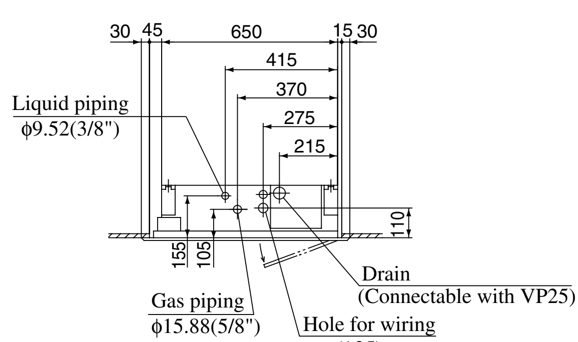
VIEW A



Decorative Panel

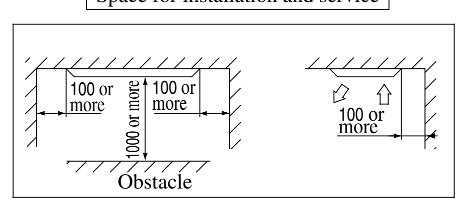


VIEW B



VIEW C

Space for installation and service

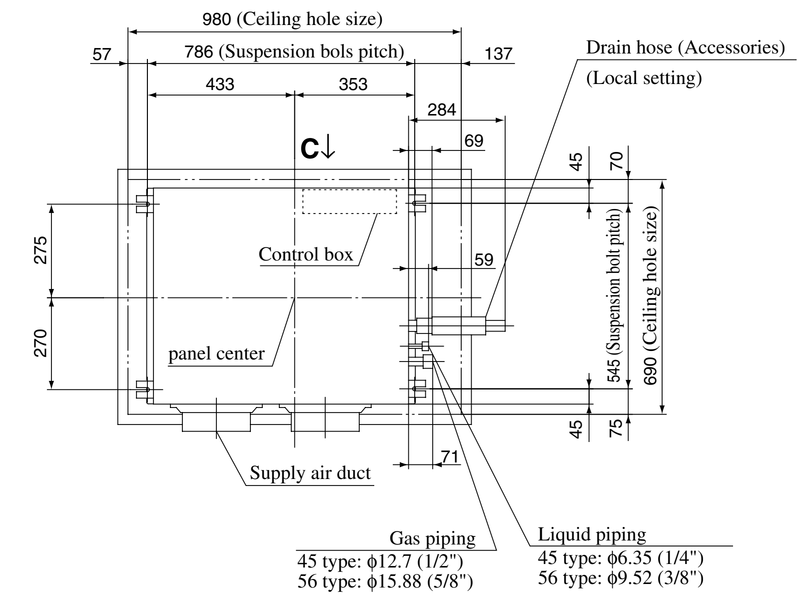


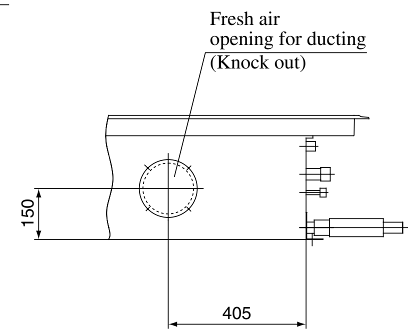
(e) Cassetteria type (FDR)

Models FDR45HKXE2, 56HKXE2

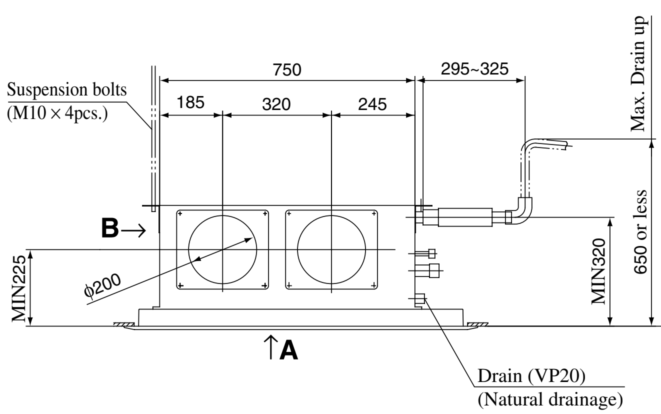
Silent Panel (Model: R-PNLS-26W-E)

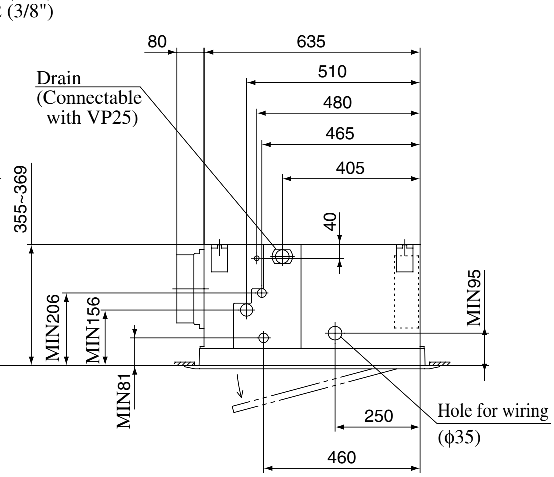
Unit : mm

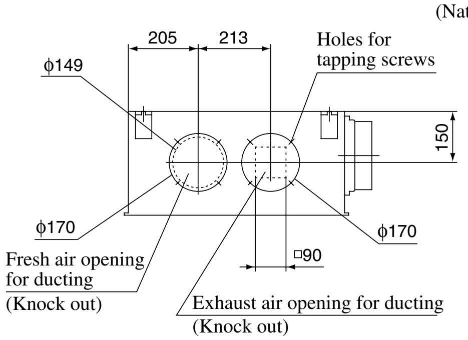




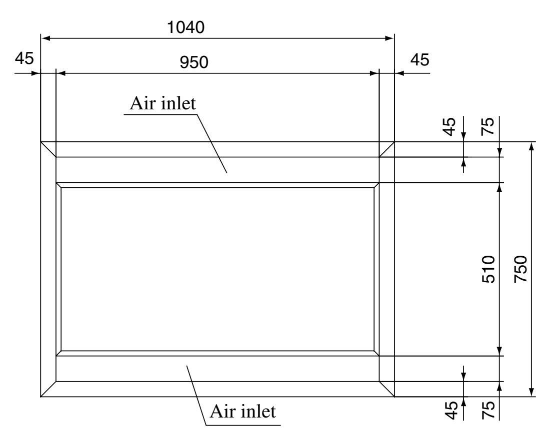
VIEW C





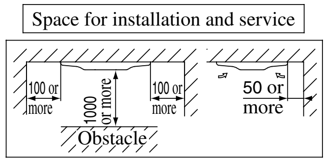


VIEW B



VIEW A

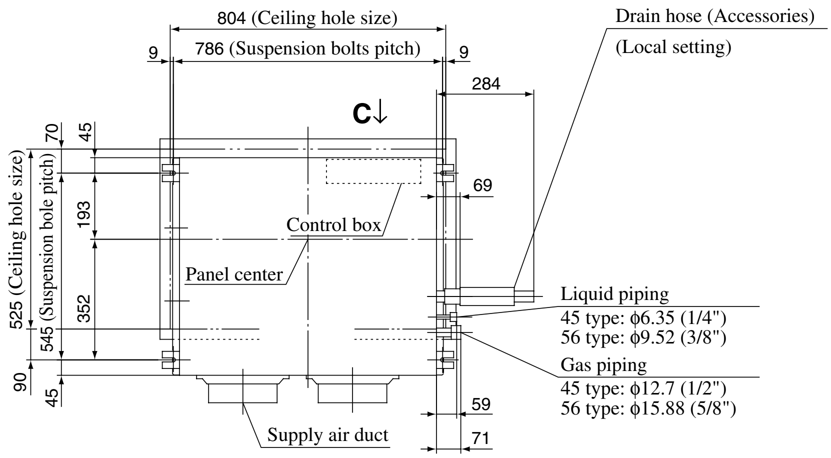
Space for installation and service

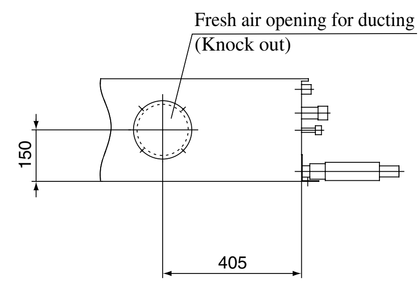


Models FDRJ45HKXE2, 56HKXE2

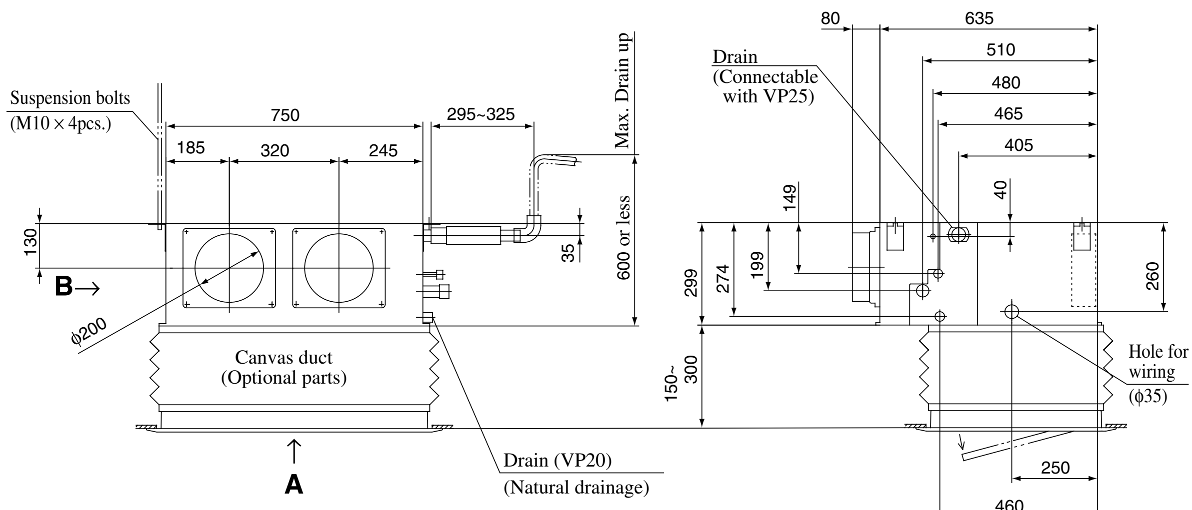
Canvas Panel (Model: R-PNLC-26W-E)

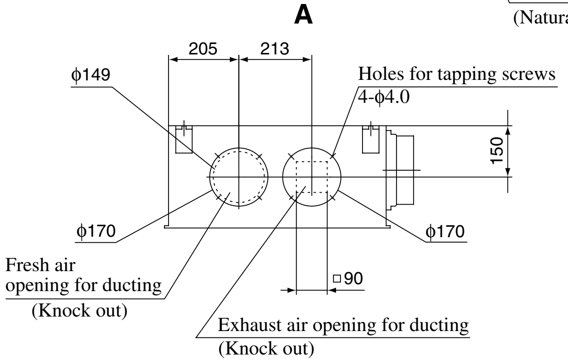
Unit : mm



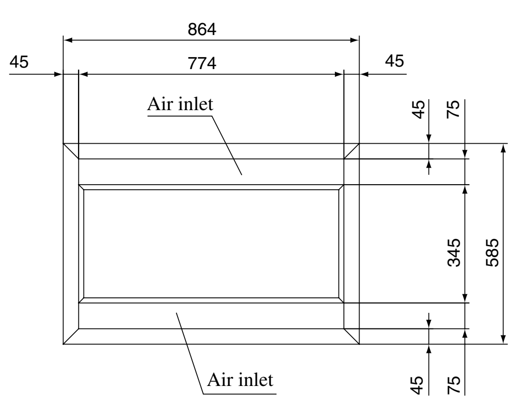


VIEW C



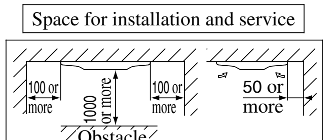


VIEW B



VIEW A

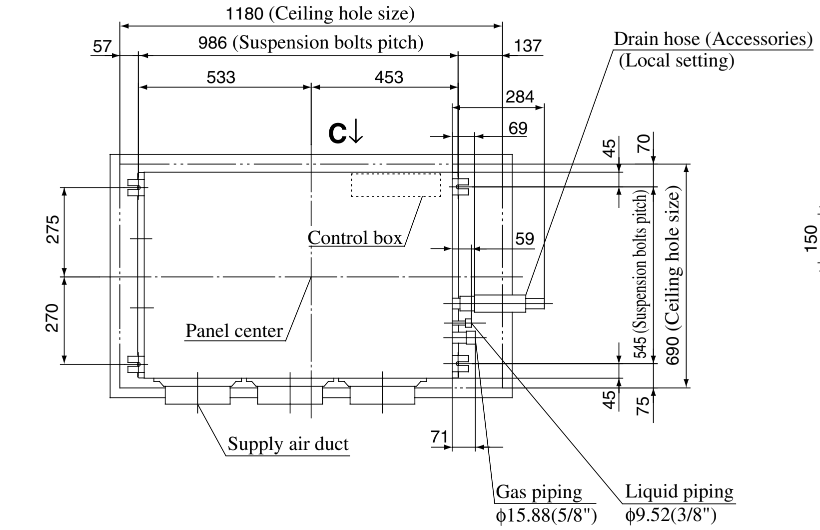
Space for installation and service

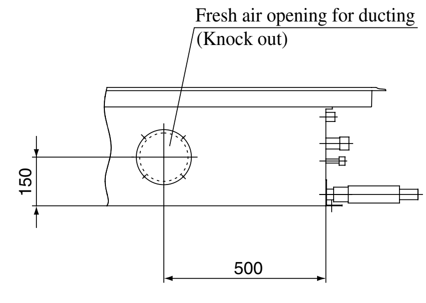


Models FDRJ71HKXE2, 90HKXE2

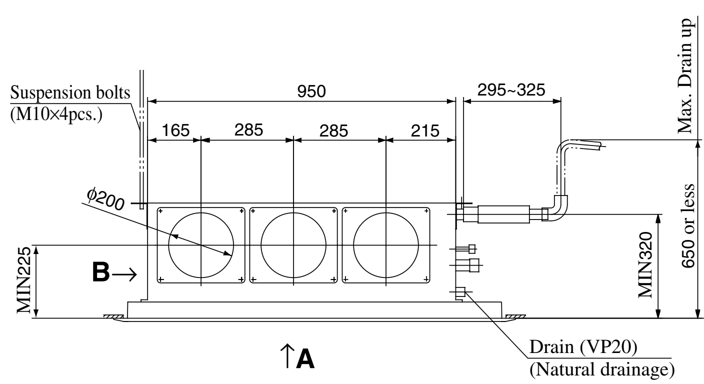
Silent Panel (Model: R-PNLS-36W-E)

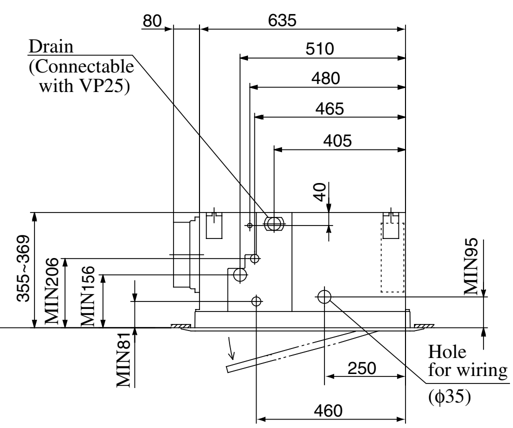
Unit : mm

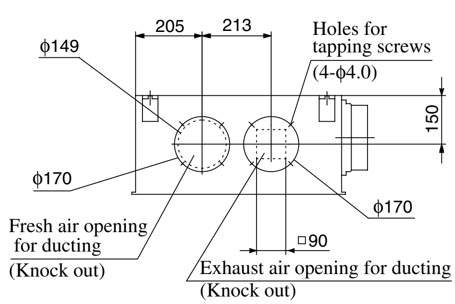




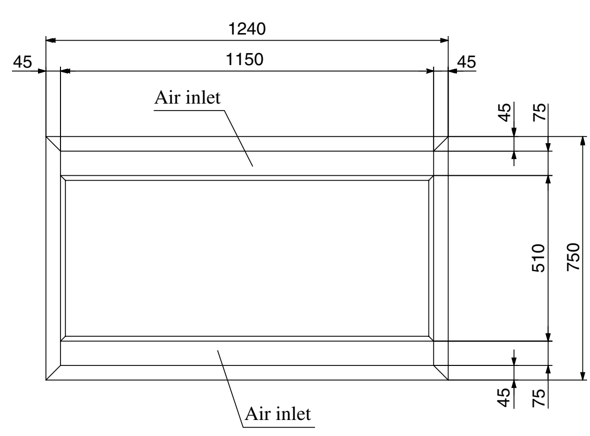
VIEW C





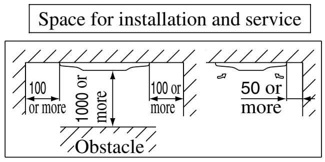


VIEW B



VIEW A

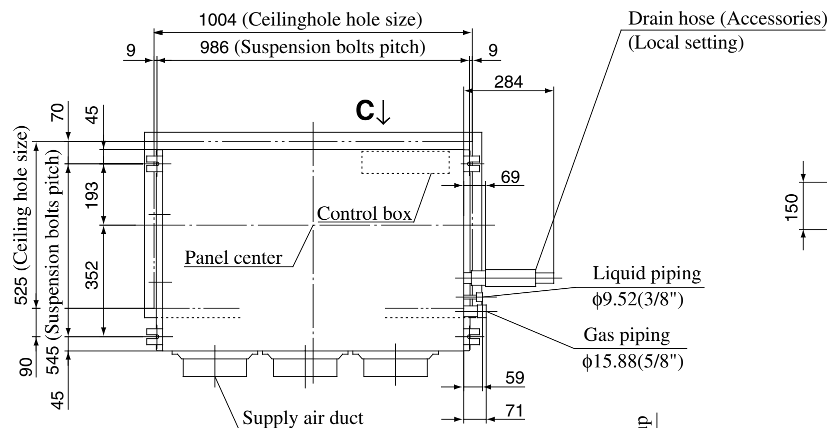
Space for installation and service

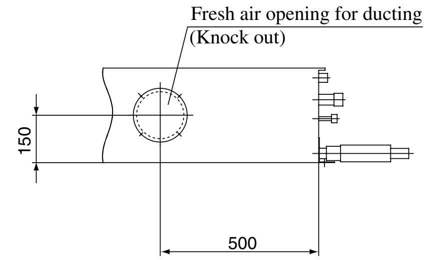


Models FDRJ71HKXE2, 90HKXE2

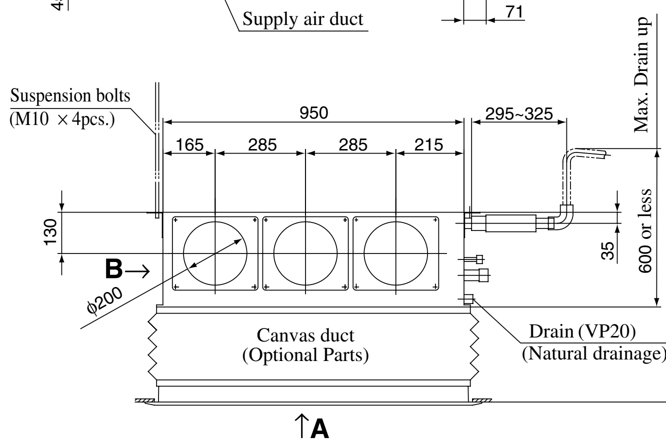
Canvas Panel (Model: R-PNLC-36W-E)

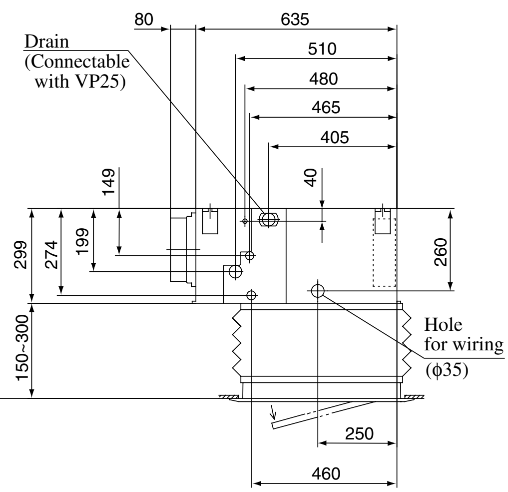
Unit : mm

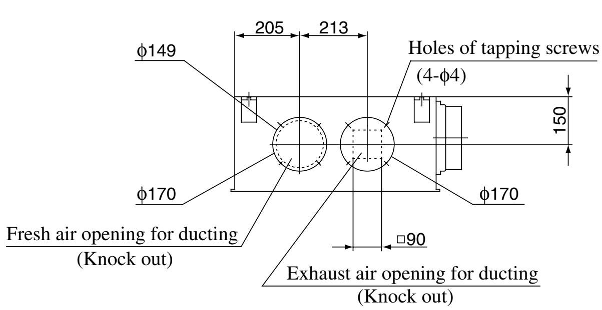




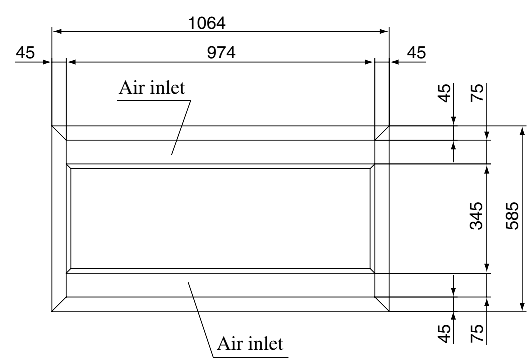
VIEW C





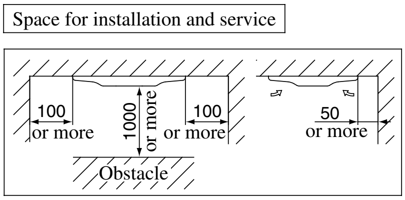


VIEW B



VIEW A

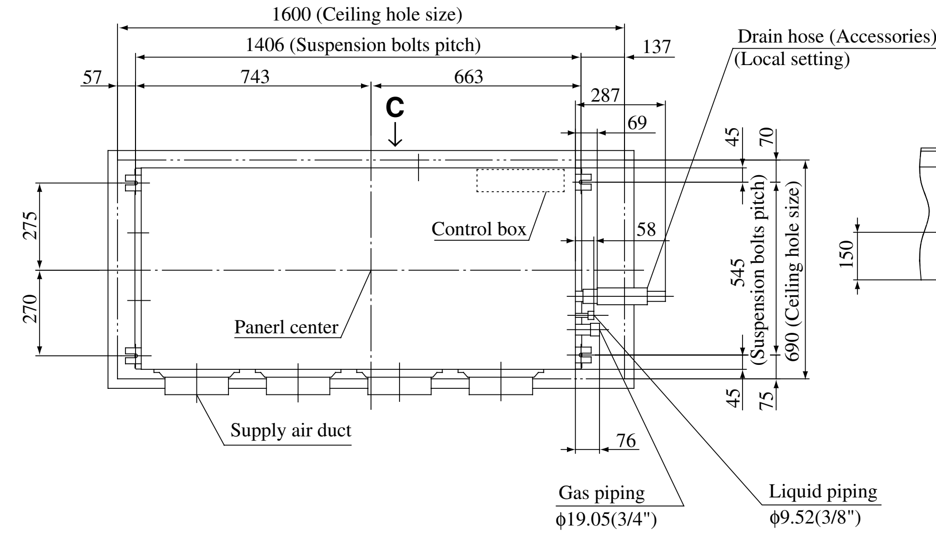
Space for installation and service

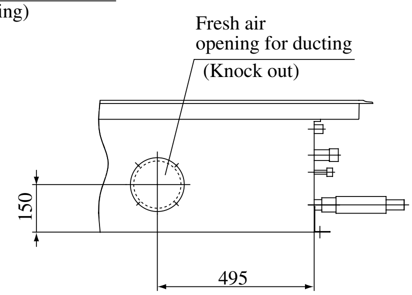


Models FDRJ112HKXE2, 140HKXE2

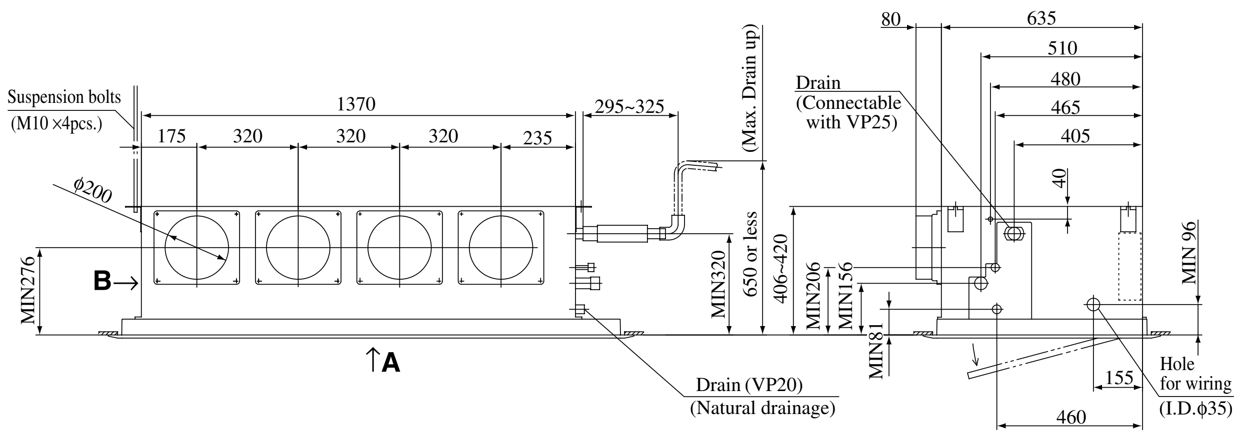
Silent Panel (Model: R-PNLS-46W-E)

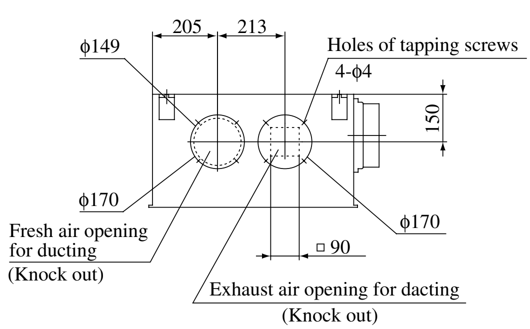
Unit : mm



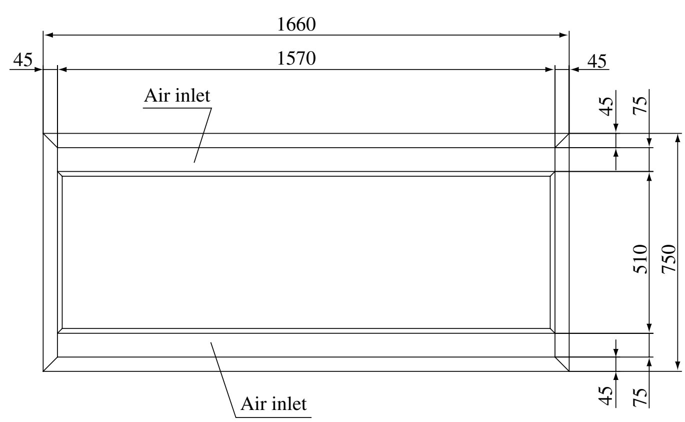


VIEW C



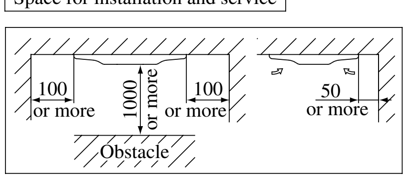


VIEW B



VIEW A

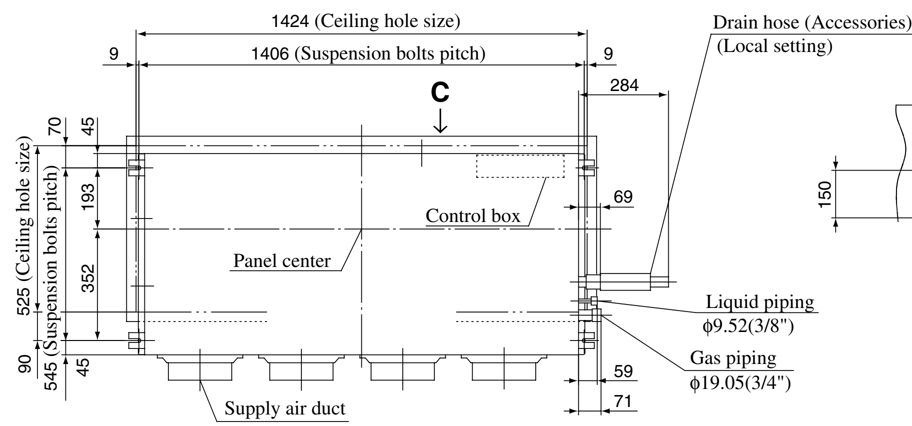
Space for installation and service

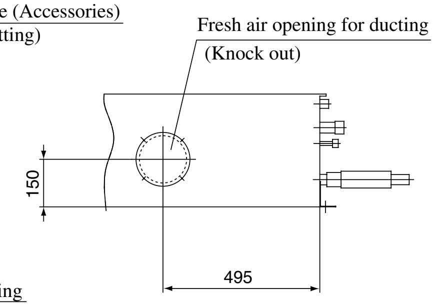


Models FDRJ112HKXE2, 140HKXE2

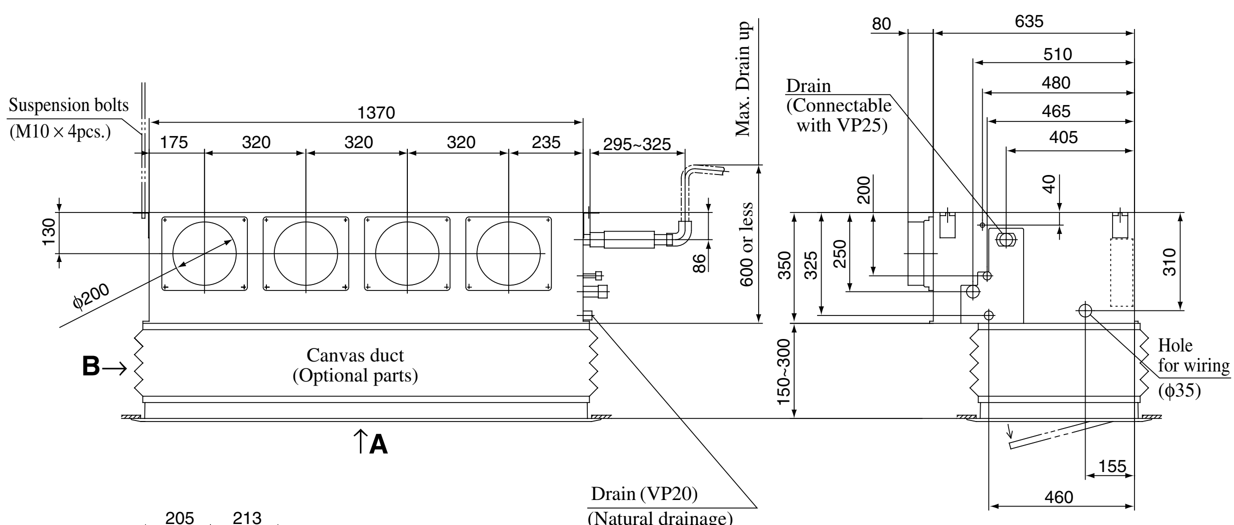
Canvas Panel (Model: R-PNLC-46W-E)

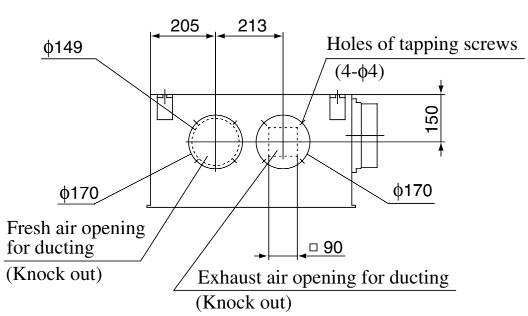
Unit : mm



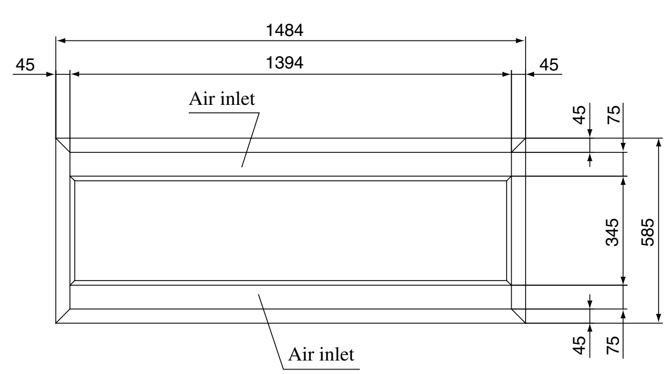


VIEW C



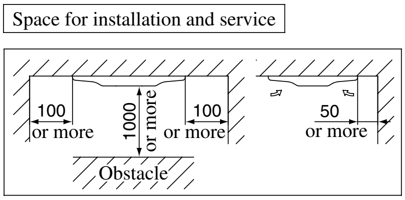


VIEW B



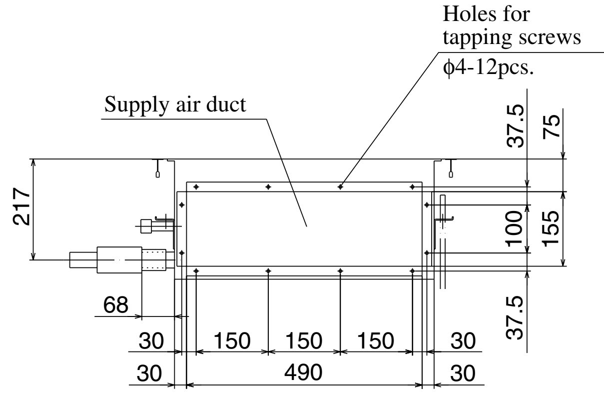
VIEW A

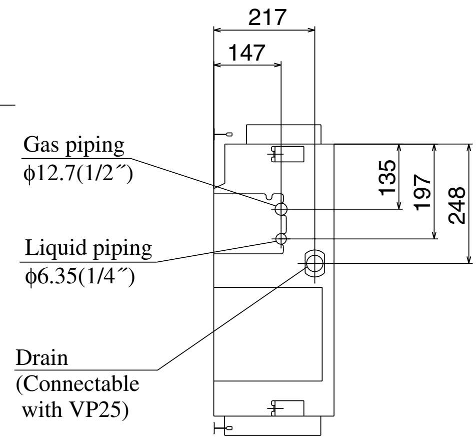
Space for installation and service



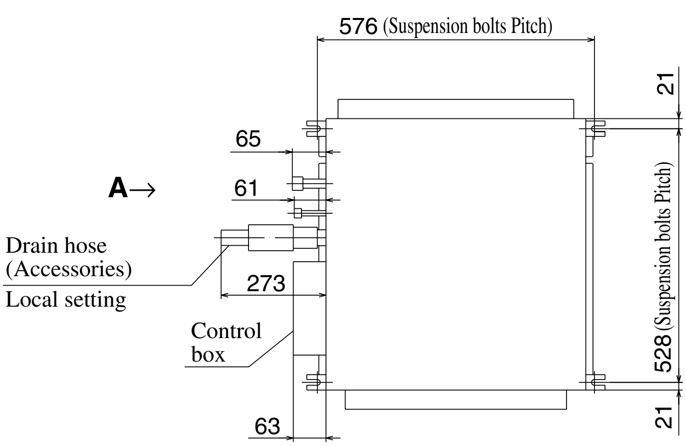
(f) Medium static pressure ducted type (FDQM)

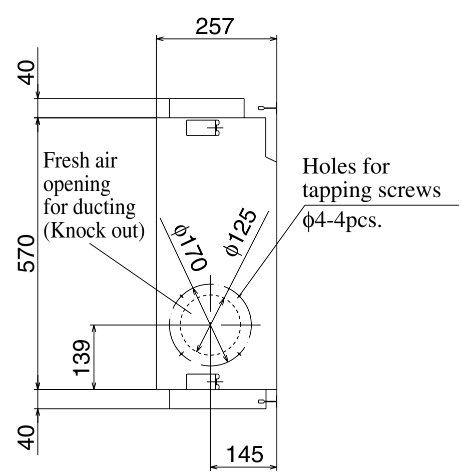
Model FDQMJ36HKXE3

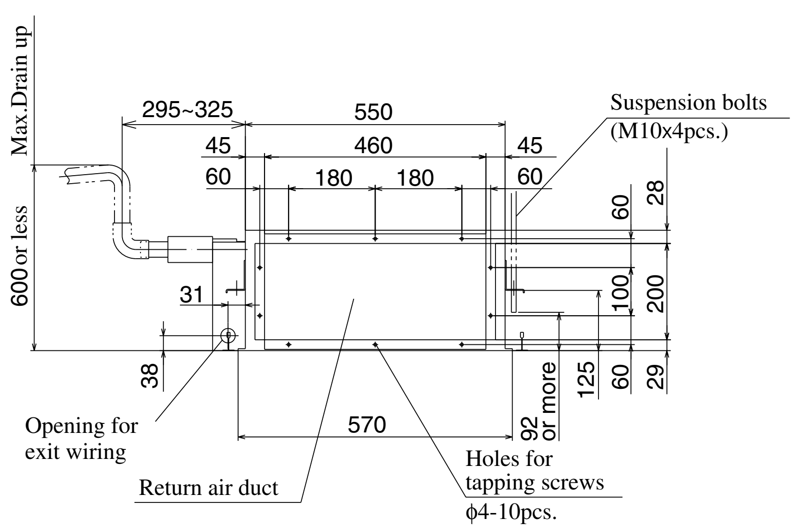


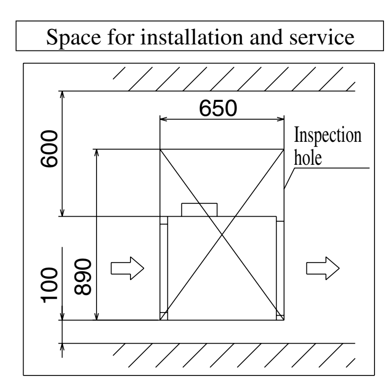


VIEW A





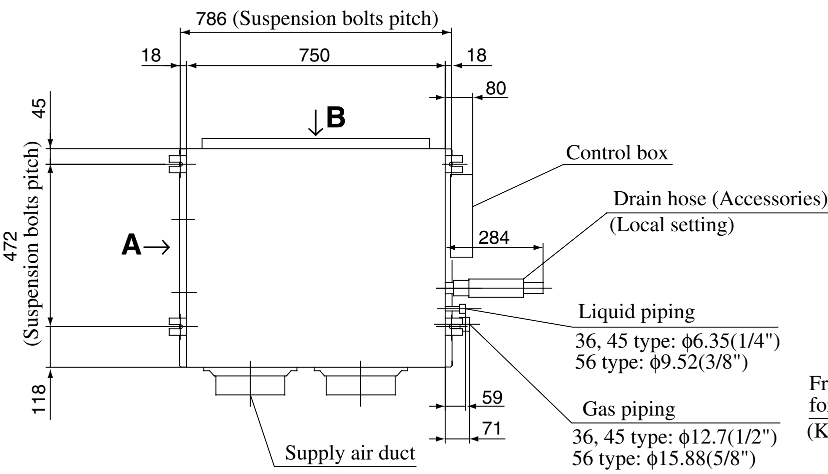


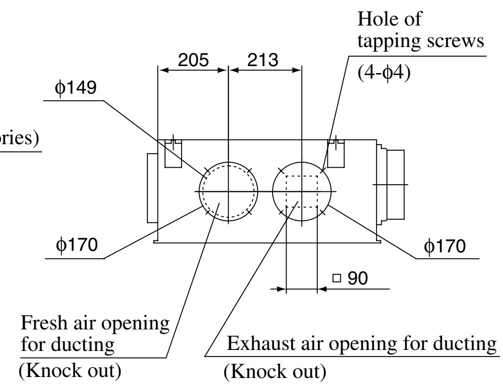


(g) Satellite ducted type (FDUM)

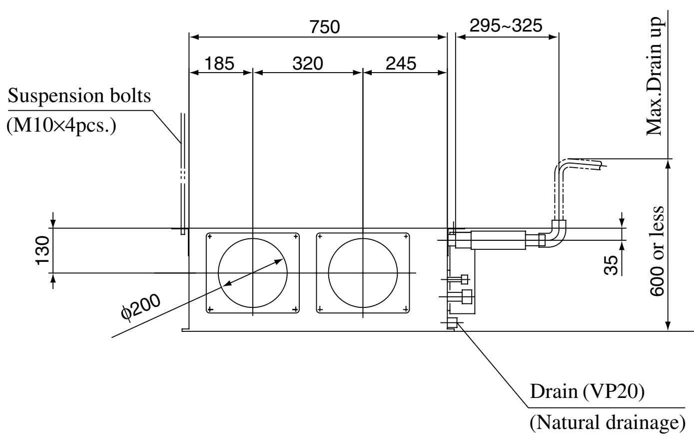
Models FDUMJ36HKXE2, 45HKXE2, 56HKXE2

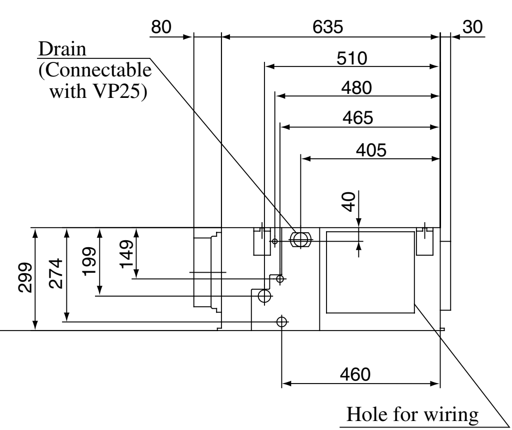
Unit : mm

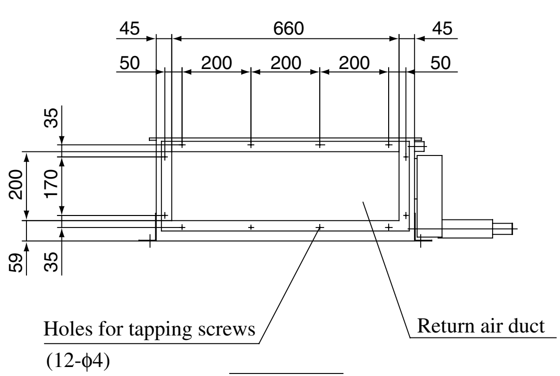




VIEW A

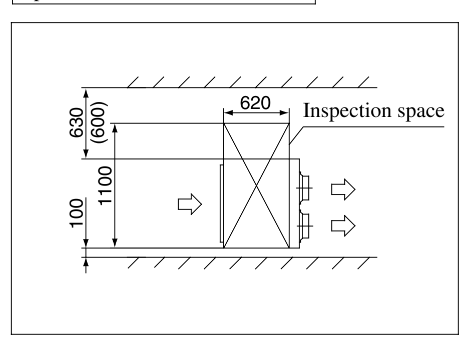






VIEW B

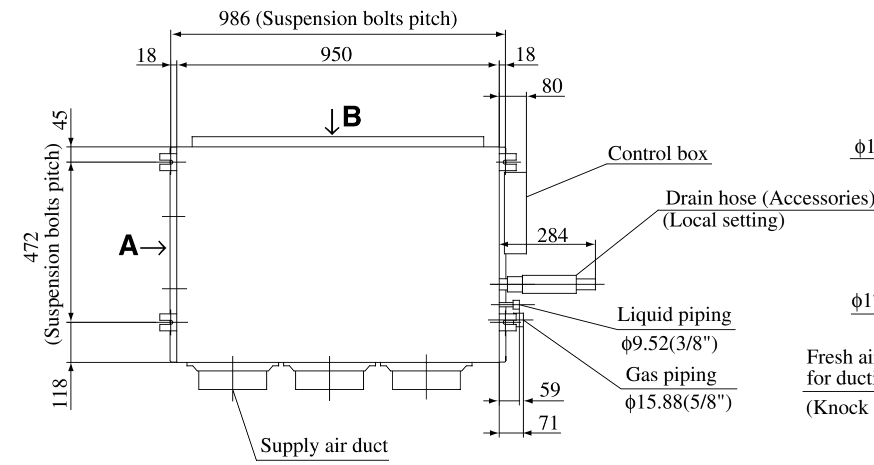
Space for installation and service

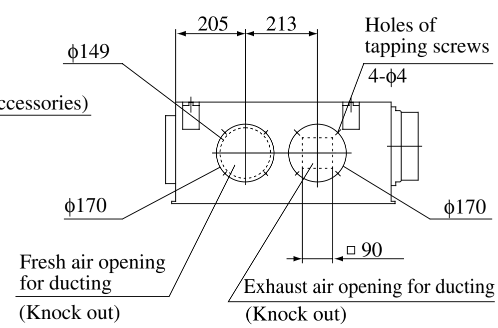


Note (1) In case that dimension shown in parenthesis ( ) is applied, it is impossible to service the humidifier from the side face.
Service the humidifier only from the under side.

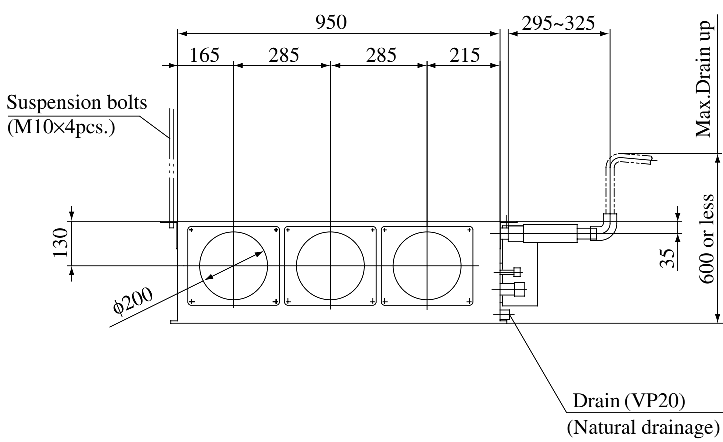
Models FDUMJ71HKXE2, 90HKXE2

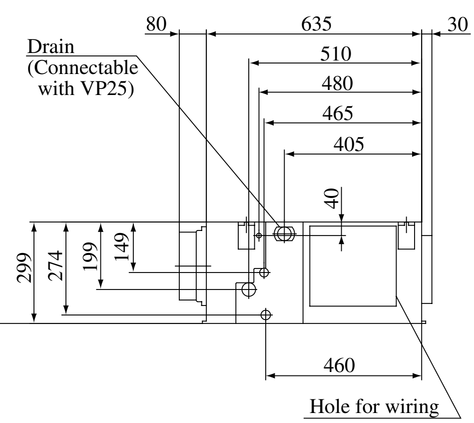
Unit : mm

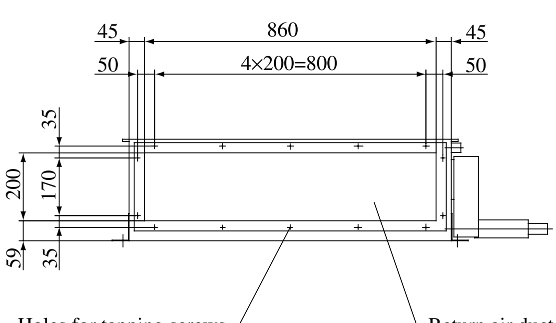




VIEW A

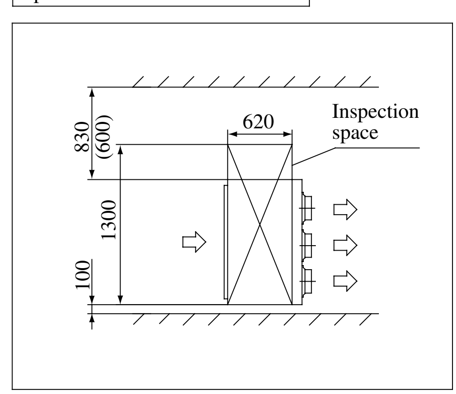






VIEW B

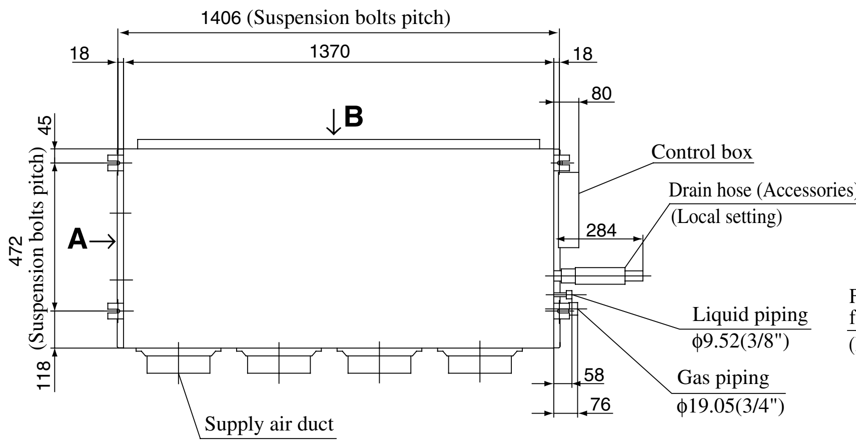
Space for installation and service

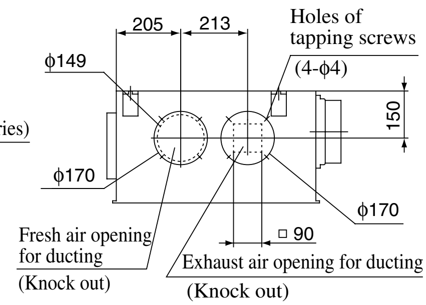


Note (1) In case that dimension shown in parenthesis ( ) is applied, it is impossible to service the humidifier from the side face.
Service the humidifier only from the under side.

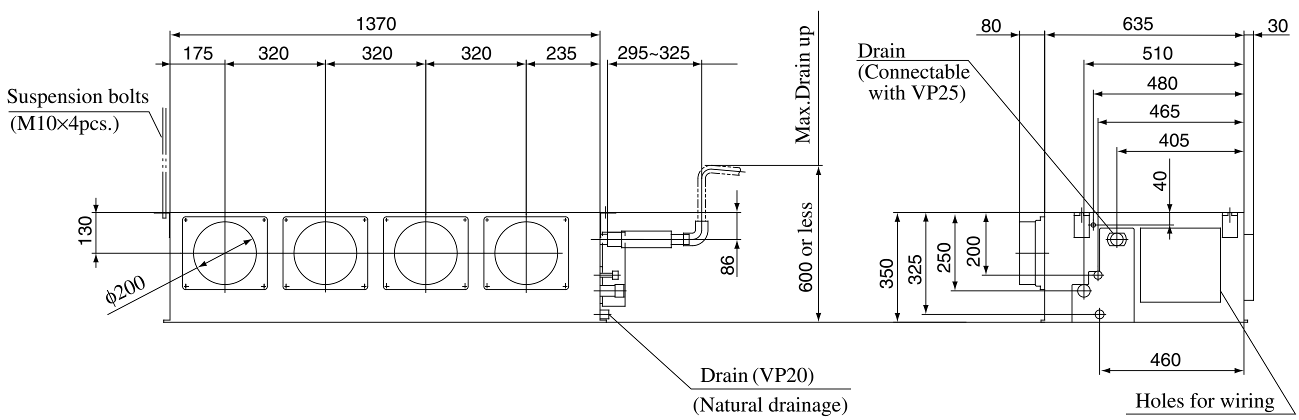
Models FDUMJ112HKXE2, 140HKXE2

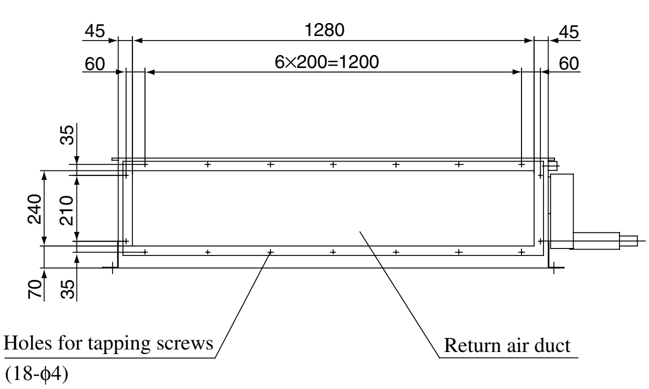
Unit : mm





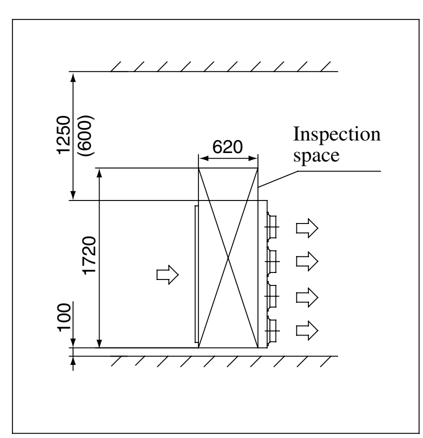
VIEW A





VIEW B

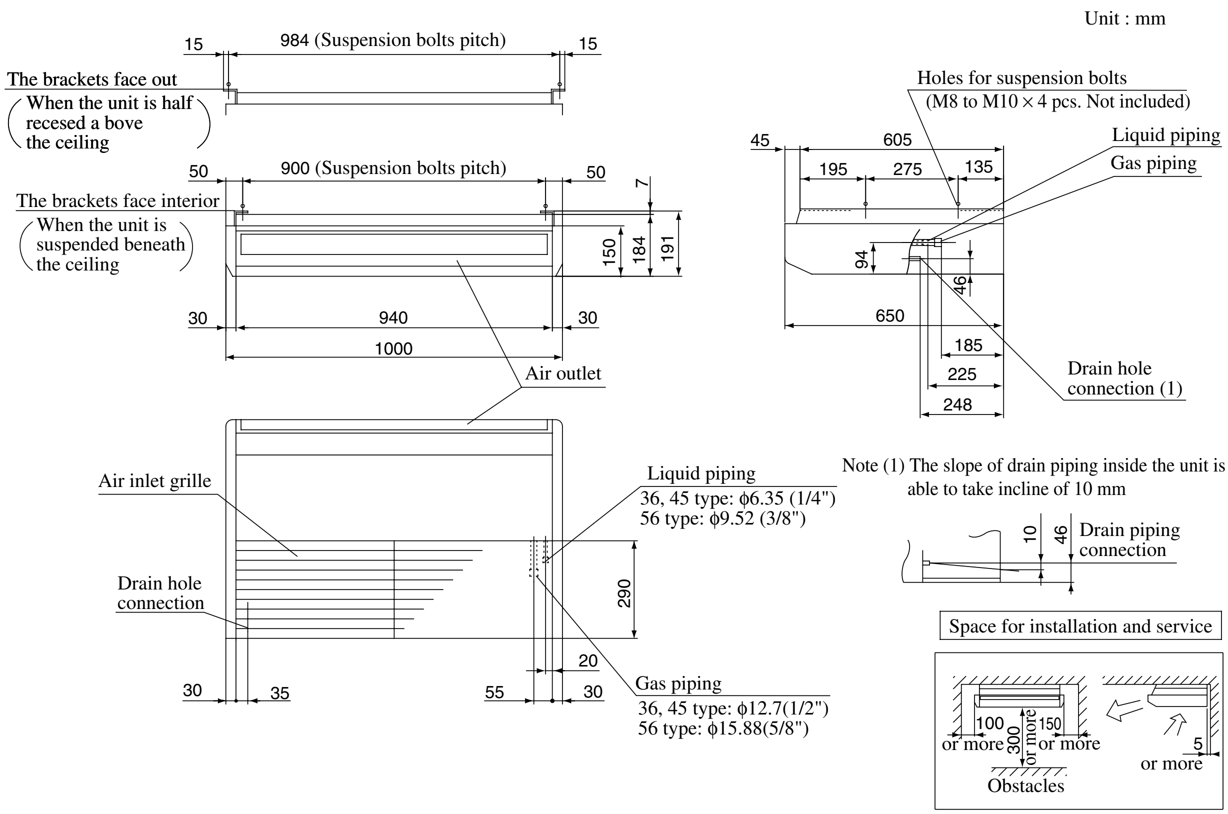
Space for installation and service



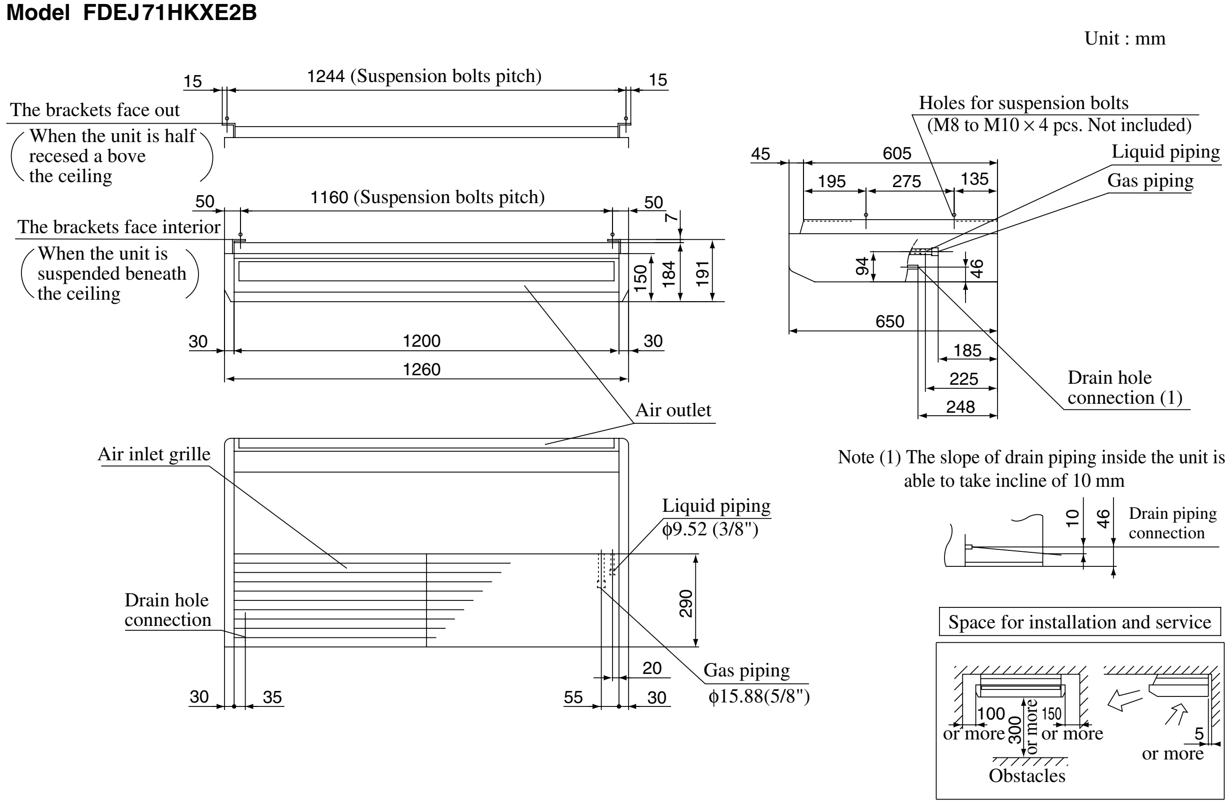
Note (1) In case that dimension shown in parenthesis ( ) is applied, it is impossible to service the humidifier from the side face.
Service the humidifier only from the under side.

(h) Ceiling suspension type (FDE)

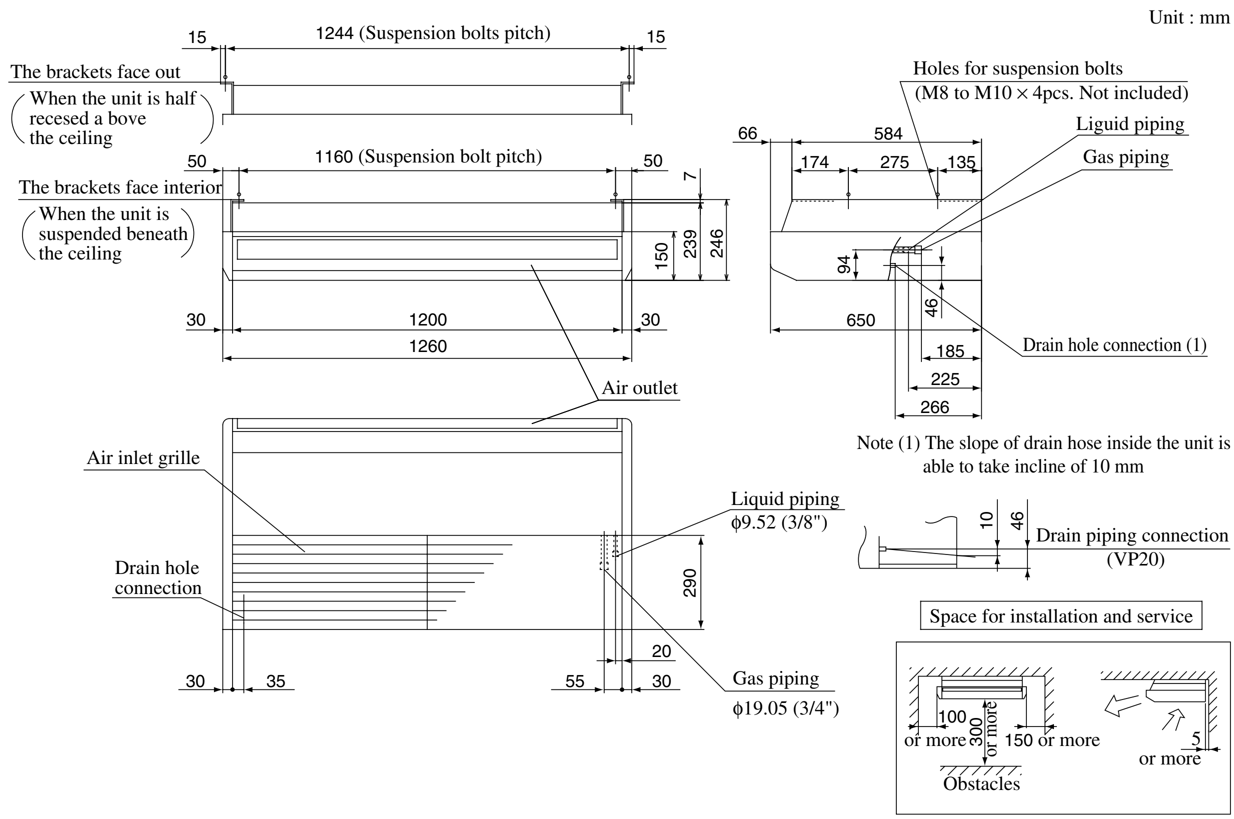
Models FDEJ36HKXE2B, 45HKXE2B, 56HKXE2B



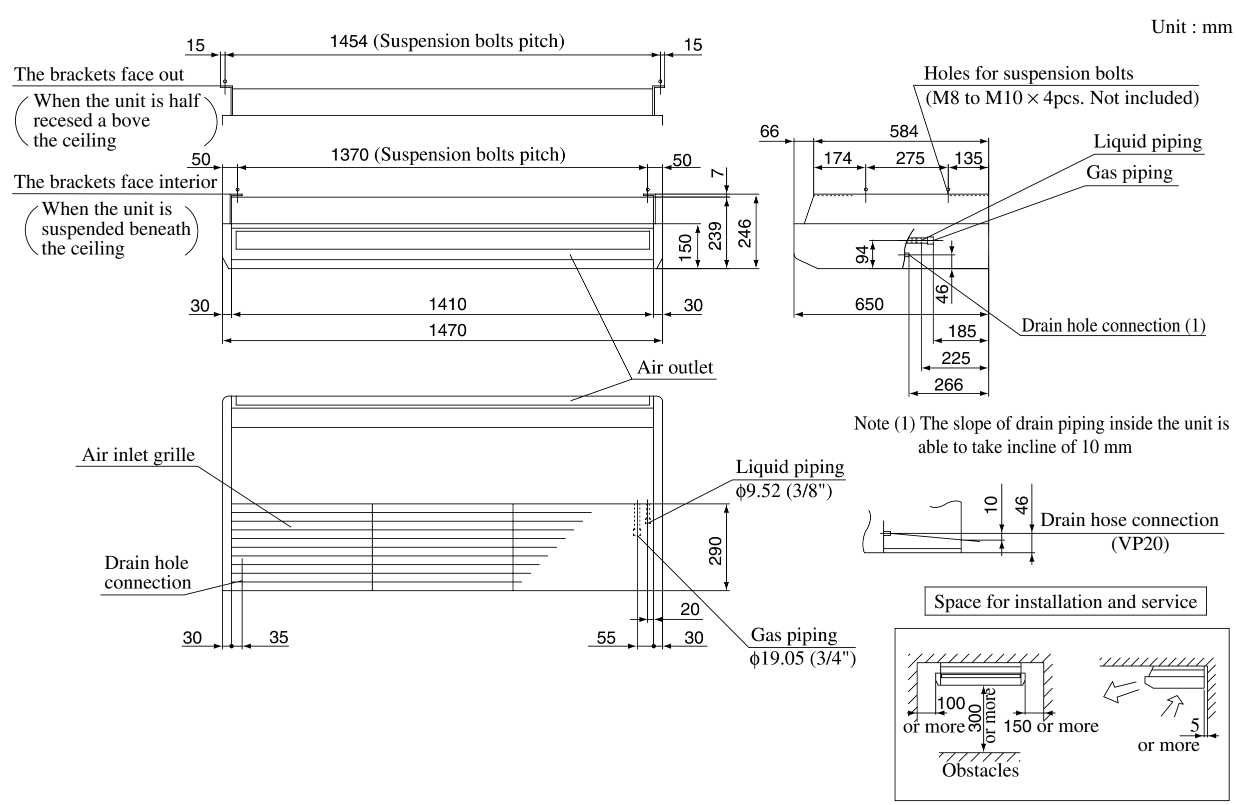
Model FDEJ71HKXE2B



Model FDEJ112HKXE2B

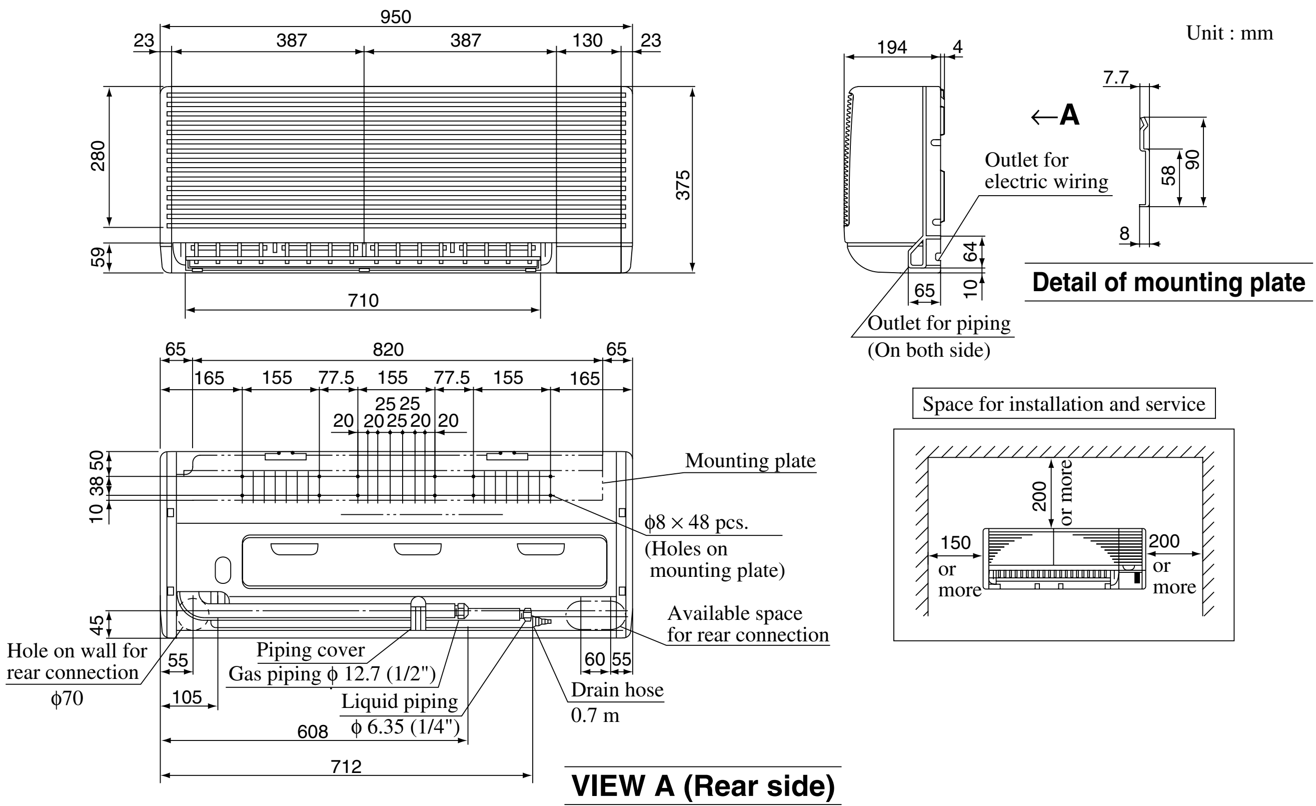


Model FDEJ140HKXE2B

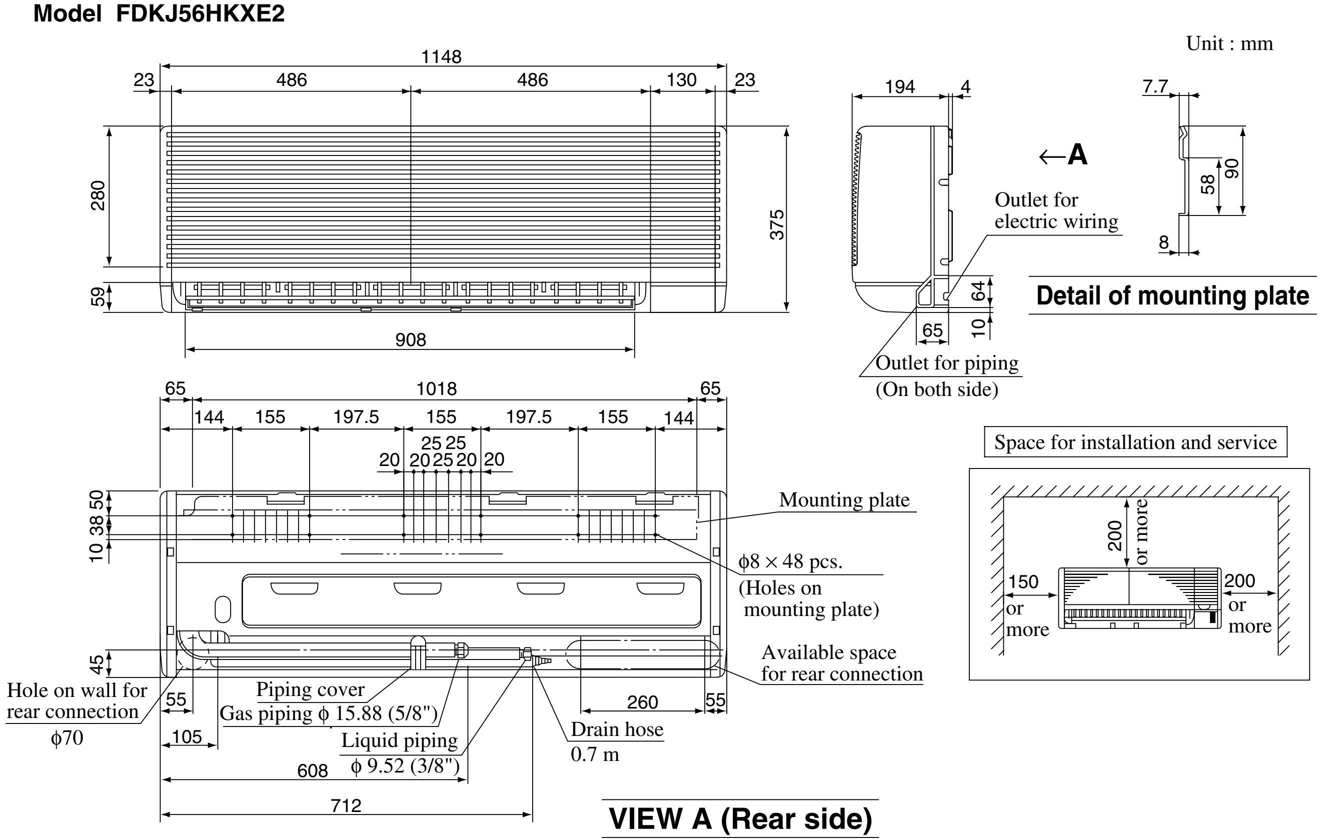


(i) Wall mounted type (FDK)

Models FDKJ22HKXE2, 28HKXE2, 36HKXE2, 45HKXE2

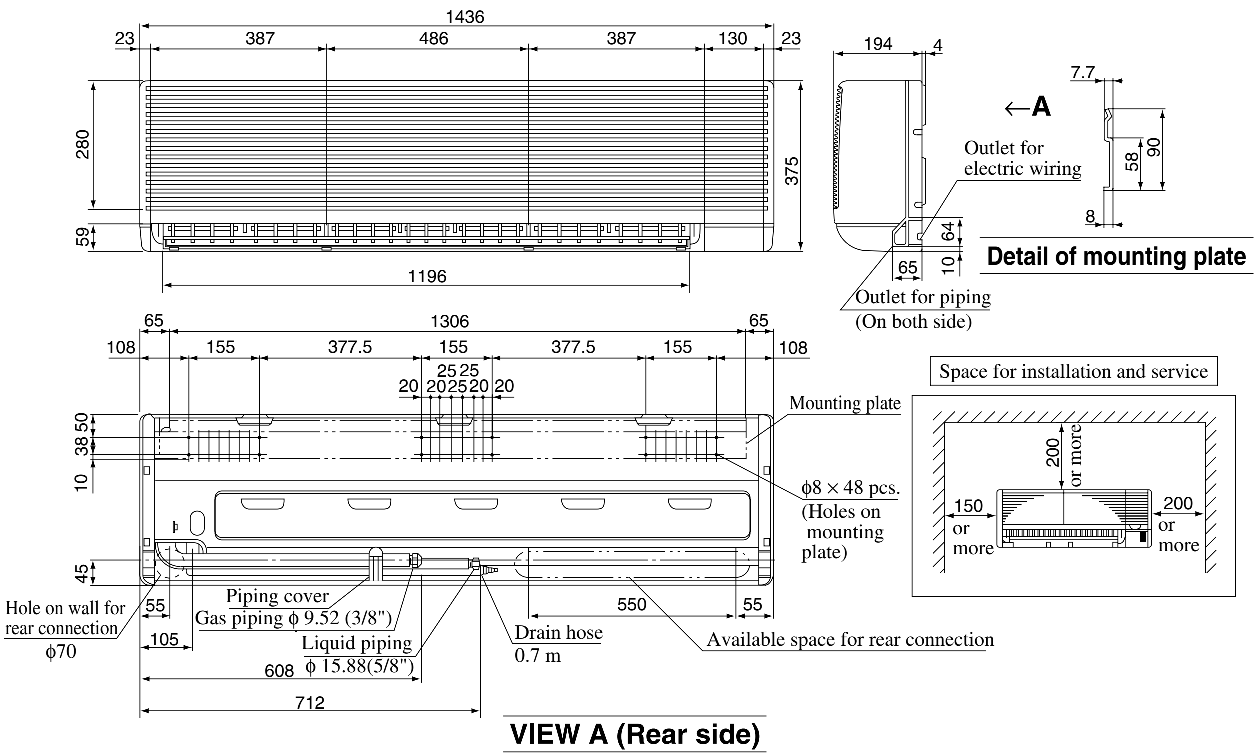


Model FDKJ56HKXE2



Model FDKJ71HKXE2

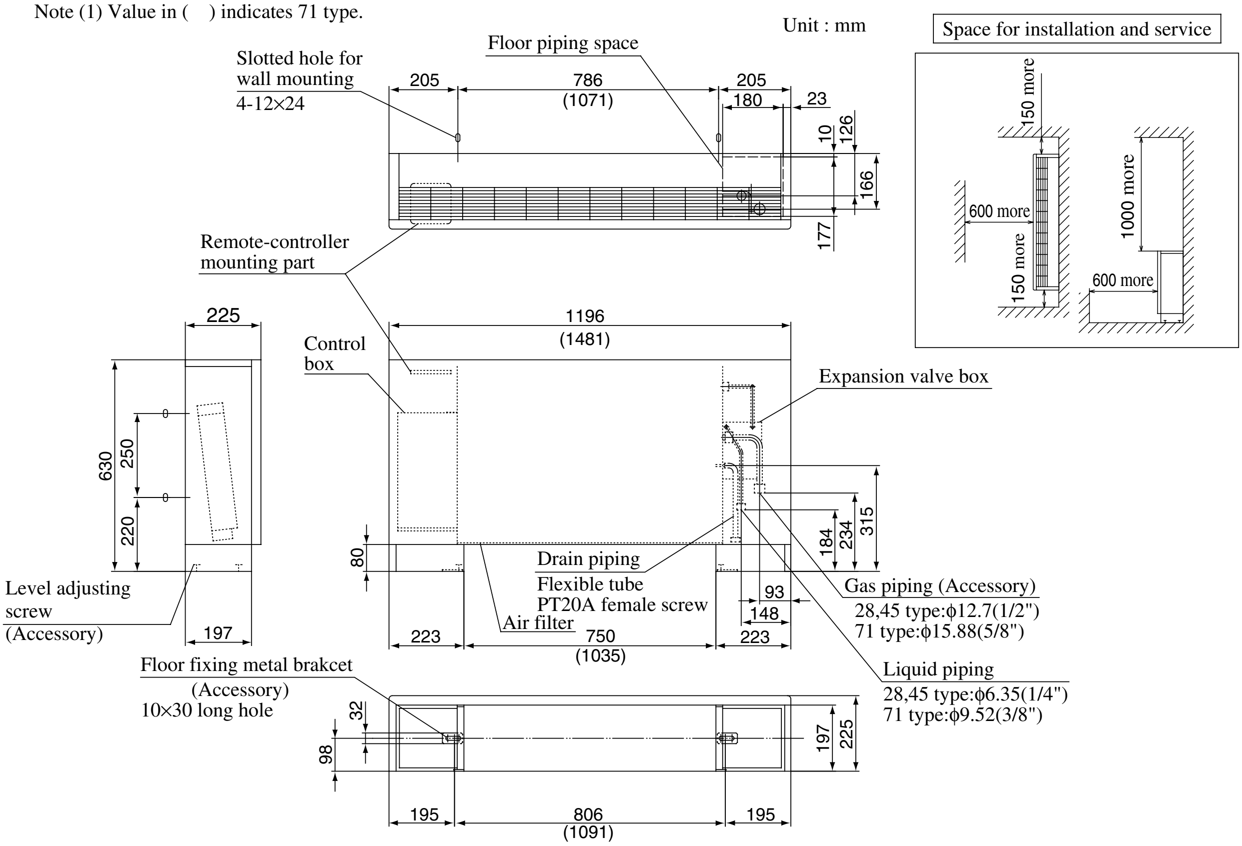
Unit : mm



(j) Floor standing exposed type (FDFL)

Models FDFLJ28HKXE2, 45HKXE2, 71HKXE2

Note (1) Value in ( ) indicates 71 type.

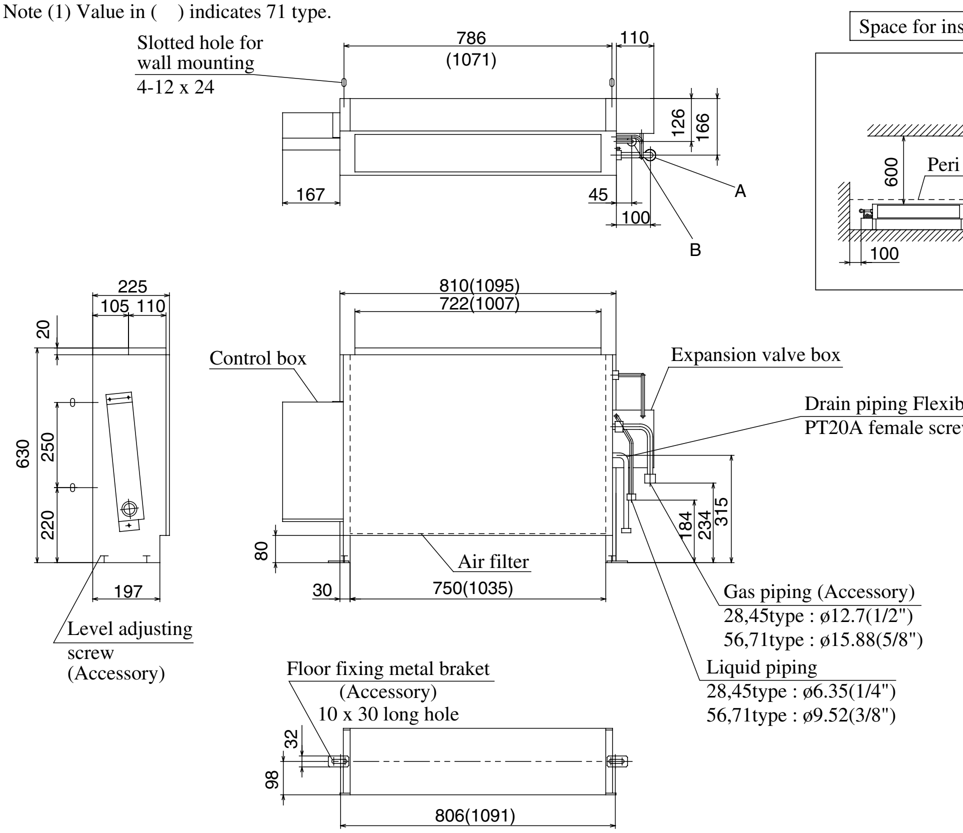


(k) Floor standing hidden type (FDFU)

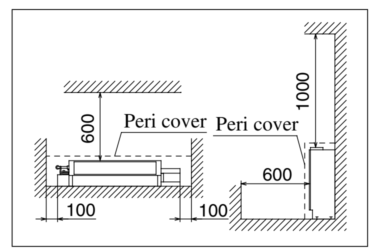
Models FDFUJ28HKXE2, 45HKXE2, 56HKXE2, FDKJ71HKXE2

Unit : mm

Note (1) Value in ( ) indicates 71 type.

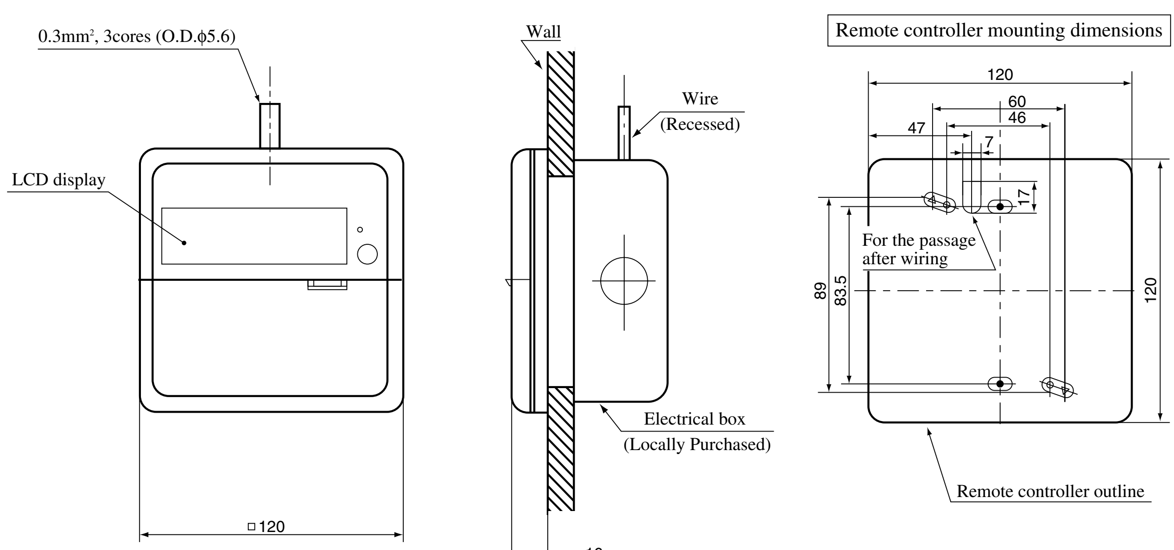


Space for installation and service



(2) Remote controller (Optional parts)

Unit: mm



Allowable rang of wire thickness and length

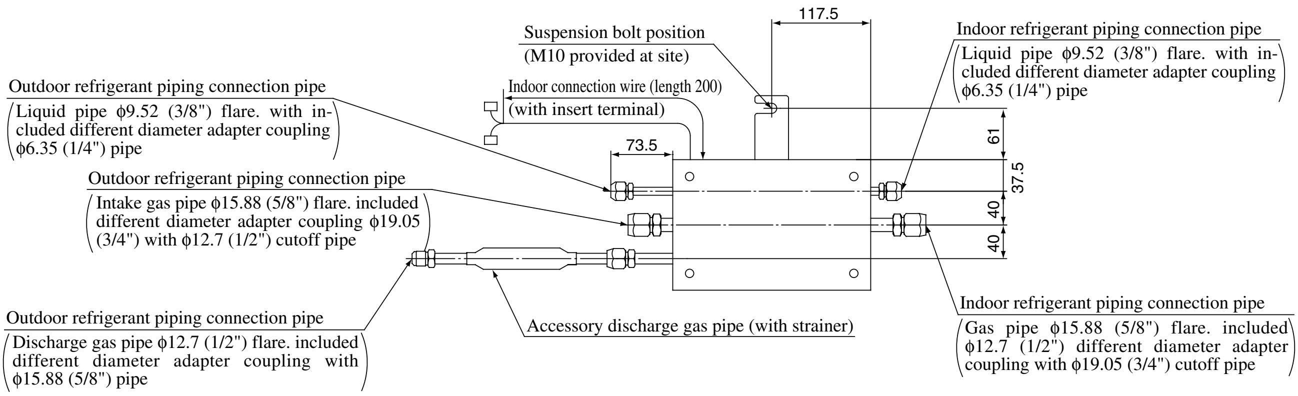
Standard Within	0.3 mm²	× Within 100 m
	0.5 mm²	× Within 200 m
	0.75 mm²	× Within 300 m
	1.25 mm²	× Within 400 m
	2 mm²	× Within 600 m

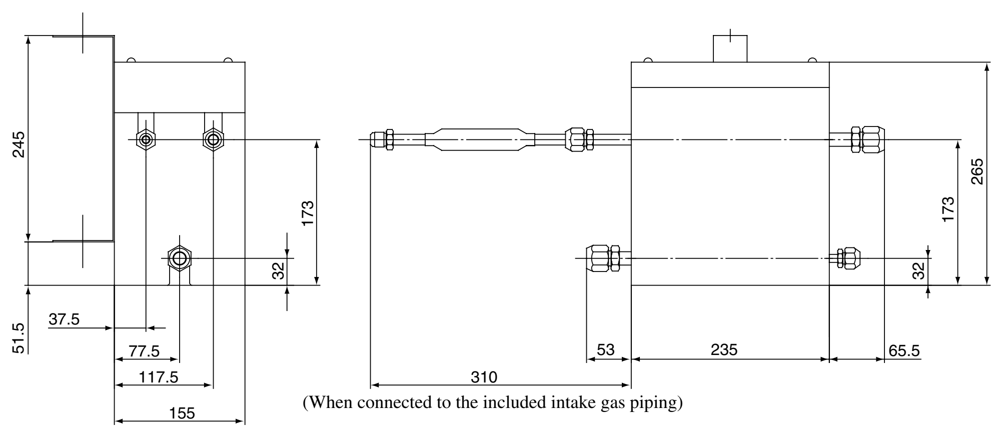
(3) Flow divide controller (Optional part)

(a) Individual flow divide controller (Optional Part)

Unit : mm

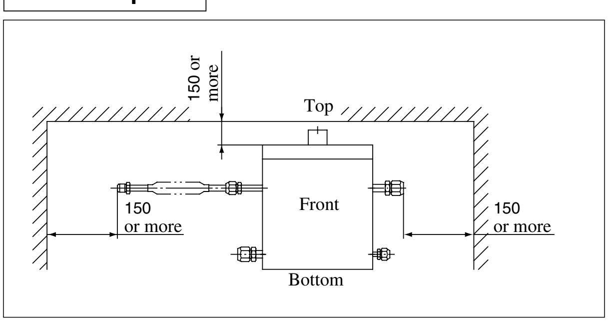
(i) HPFD01R-E



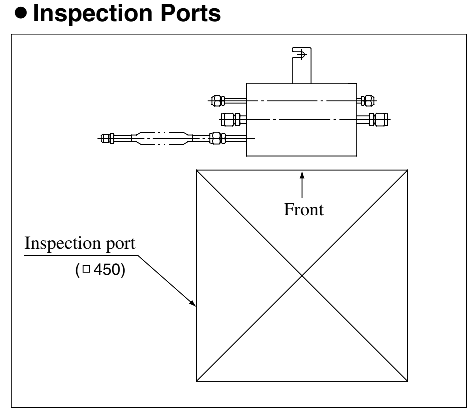


(When connected to the included intake gas piping)

Service space



● Inspection Ports



Notes (1) Do not operate the unit without the indoor unit connected to the individual flow divide controller.

(2) Be sure to install the included strainer in the outdoor discharge gas connection pipe.

(3) Do not install the flow divide controller upside down. Install so that the body is level.

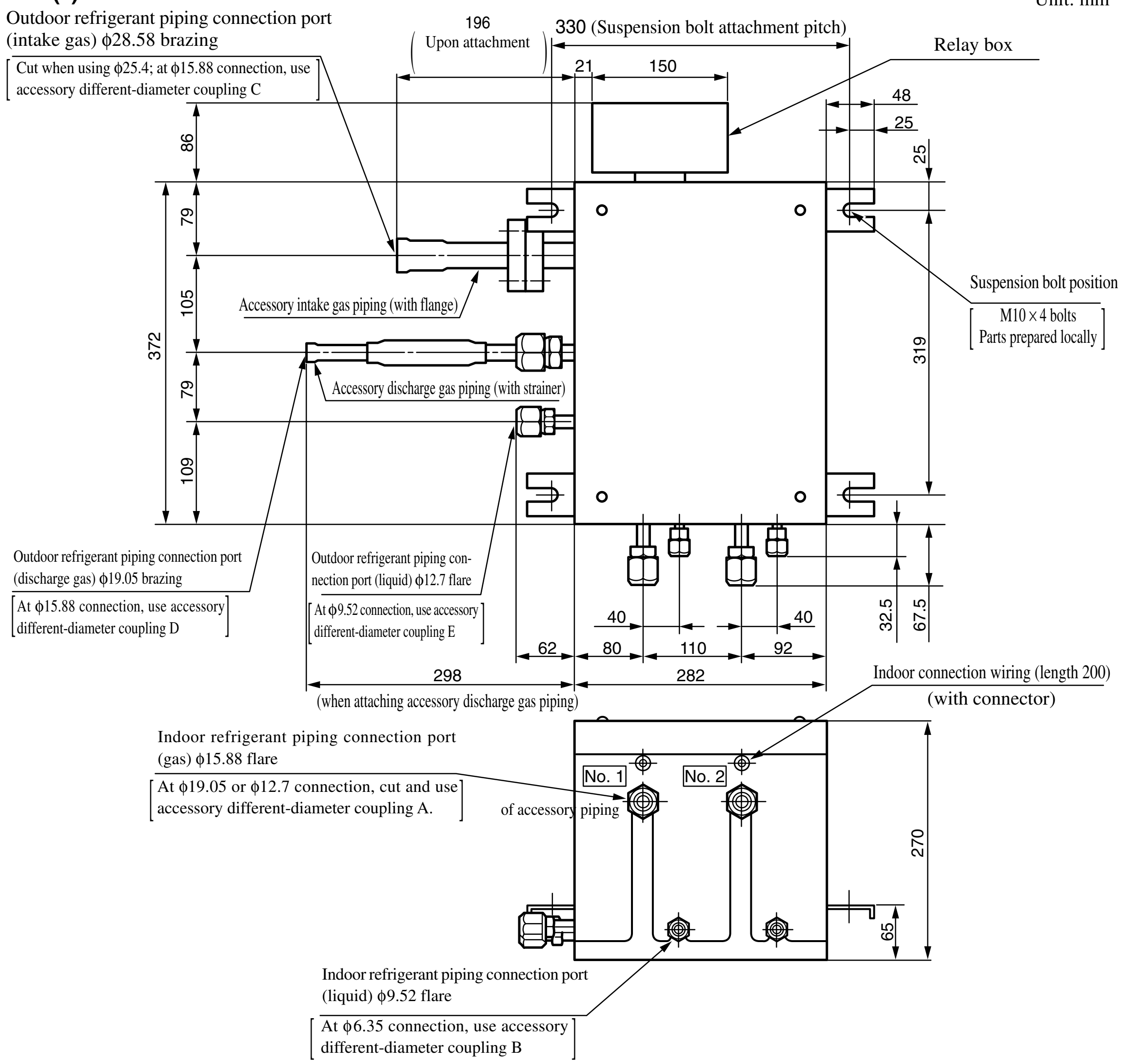
(4) Weight: 6 kg

(5) Use the indoor unit connection capacity to select a different diameter adapter coupling from the foliowing table. (Use the flare nuts that are included with the flow divide controller.)

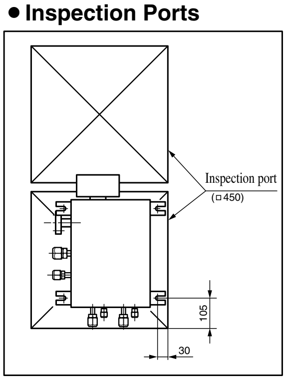
Different diameter adapter coupling				
For indoor gas piping	For indoor liquid piping	For outdoor intake gas piping	For outdoor dischage gas piping	For outdoor liquid piping
1 unit	1 unit	1 unit	1 unit	1 unit
OD15.88 ID12.7 ID19.05 A	OD9.52 ID6.35 B	OD15.88 ID12.7 ID19.05 C	OD12.7 ID15.88 D	OD9.52 ID6.35 E

(b) Central flow divide controller (Optional port)

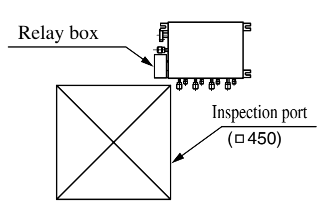
(i) HPFDO2R-E



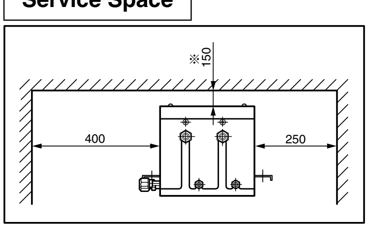
- **Inspection Ports**

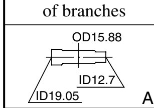
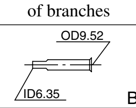
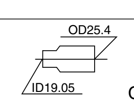
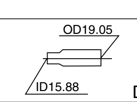
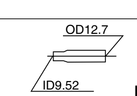


Note (1) If the number of indoor connected units is less than the number of branches, connect in sequence from the front right side. Tighten securely the flare connectors not in use.
(2) Always attach an accessory strainer at the outdoor discharge gas connection port.
(3) Flow divide controllers cannot be installed upside down. Install them so that the indoor unit is level.
(4) If space of 400 or more is available above the flow divide controller (* mark), inspection ports can be located at the points shown in the figure right. (Change the position of the relay box.)
(5) Weight: 17kg
(6) Connect an appropriate different diameter adapter coupling selected from the table below depending on the capacity of the indoor unit to be connected. (Use the flare nut attached to the flow divide controller.)

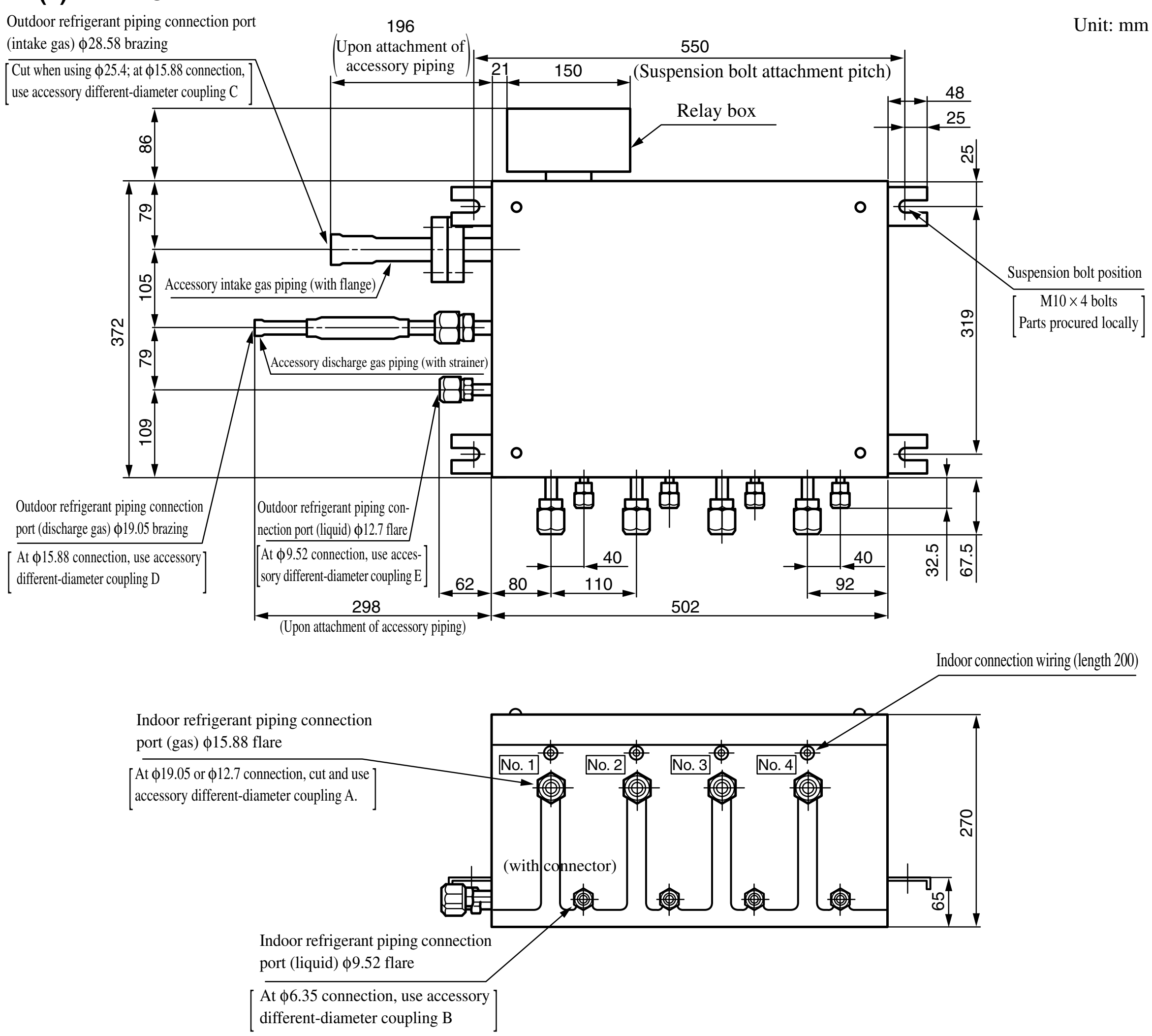


Service Space

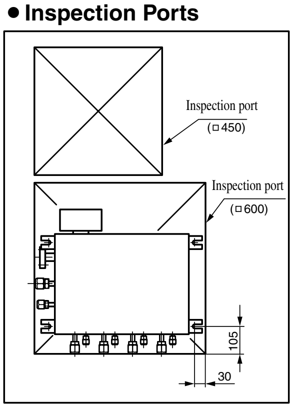


Different diameter adapter coupling				
For indoor gas piping	For indoor liquid piping	For outdoor intake gas piping	For outdoor dischage gas piping	For outdoor liquid piping
Quantity equal to the number of branches	Quantity equal to the number of branches	1 unit	1 unit	1 unit
				

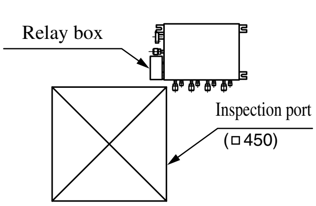
(ii) HPFDO4R-E



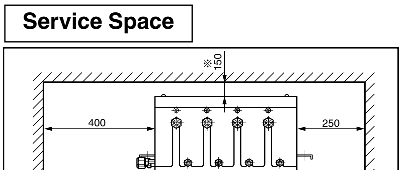
• Inspection Ports



Note (1) If the number of indoor connected units is less than the number of branches, connect in sequence from the front right side. Tighten securely the flare connectors not in use.
(2) Always attach an accessory strainer at the outdoor discharge gas connection port.
(3) Flow divide controllers cannot be installed upside down. Install them so that the indoor unit is level.
(4) If space of 400 or more is available above the flow divide controller (* mark), inspection ports can be located at the points shown in the figure right. (Change the position of the relay box.)
(5) Weight: 26kg
(6) Connect an appropriate different diameter adapter coupling selected from the table below depending on the capacity of the indoor unit to be connected. (Use the flare nut attached to the flow divide controller.)



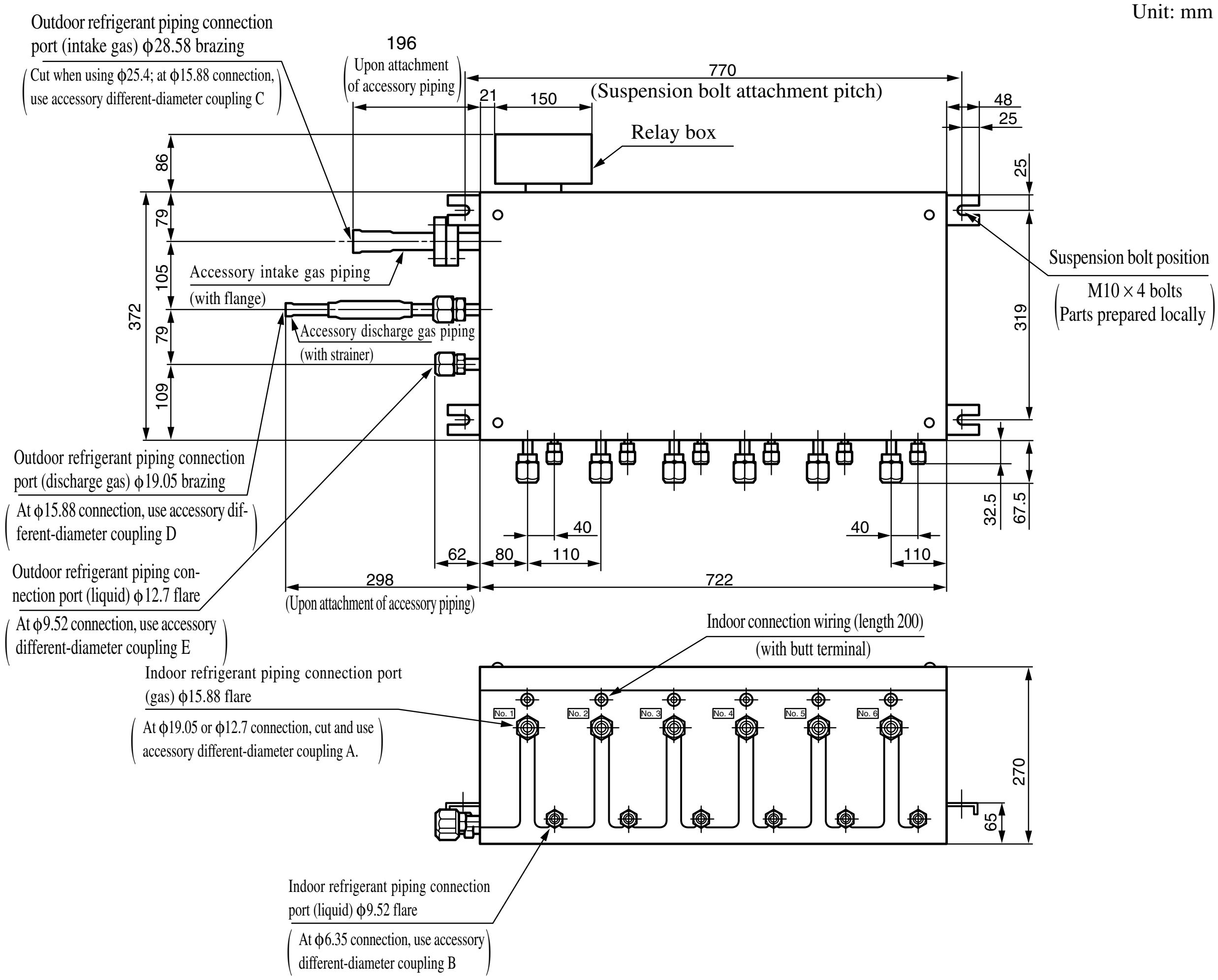
Service Space



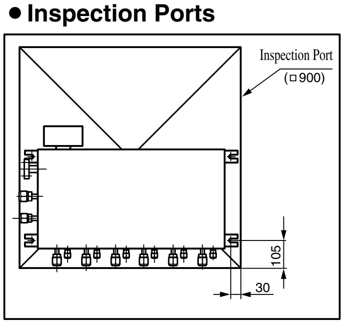
Different diameter adapter coupling				
For indoor gas piping	For indoor liquid piping	For outdoor intake gas piping	For outdoor dischage gas piping	For outdoor liquid piping
Quantity equal to the number of branches	Quantity equal to the number of branches	1 unit	1 unit	1 unit
OD15.88 ID12.7 ID19.05 A	OD9.52 ID6.35 B	OD25.4 ID19.05 C	OD19.05 ID15.88 D	OD12.7 ID9.52 E

(iii) HPFDO6R-E

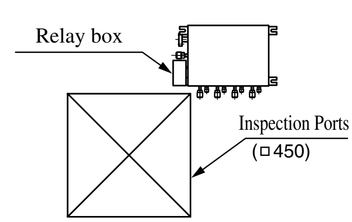
Unit: mm



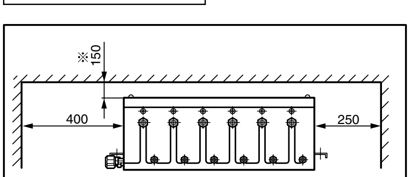
• Inspection Ports



Note (1) If the number of indoor connected units is less than the number of branches, connect in sequence from the front right side. Tighten securely the flare connectors not in use.
(2) Always attach an accessory strainer at the outdoor discharge gas connection port.
(3) Flow divide controllers cannot be installed upside down. Install them so that the indoor unit is level.
(4) If space of 400 or more is available above the flow divide controller (* mark), inspection ports can be located at the points shown in the figure right. (Change the position of the relay box.)
(5) Weight: 35kg
(6) Connect an appropriate different diameter adapter coupling selected from the table below depending on the capacity of the indoor unit to be connected. (Use the flare nut attached to the flow divide controller.)



Service Space

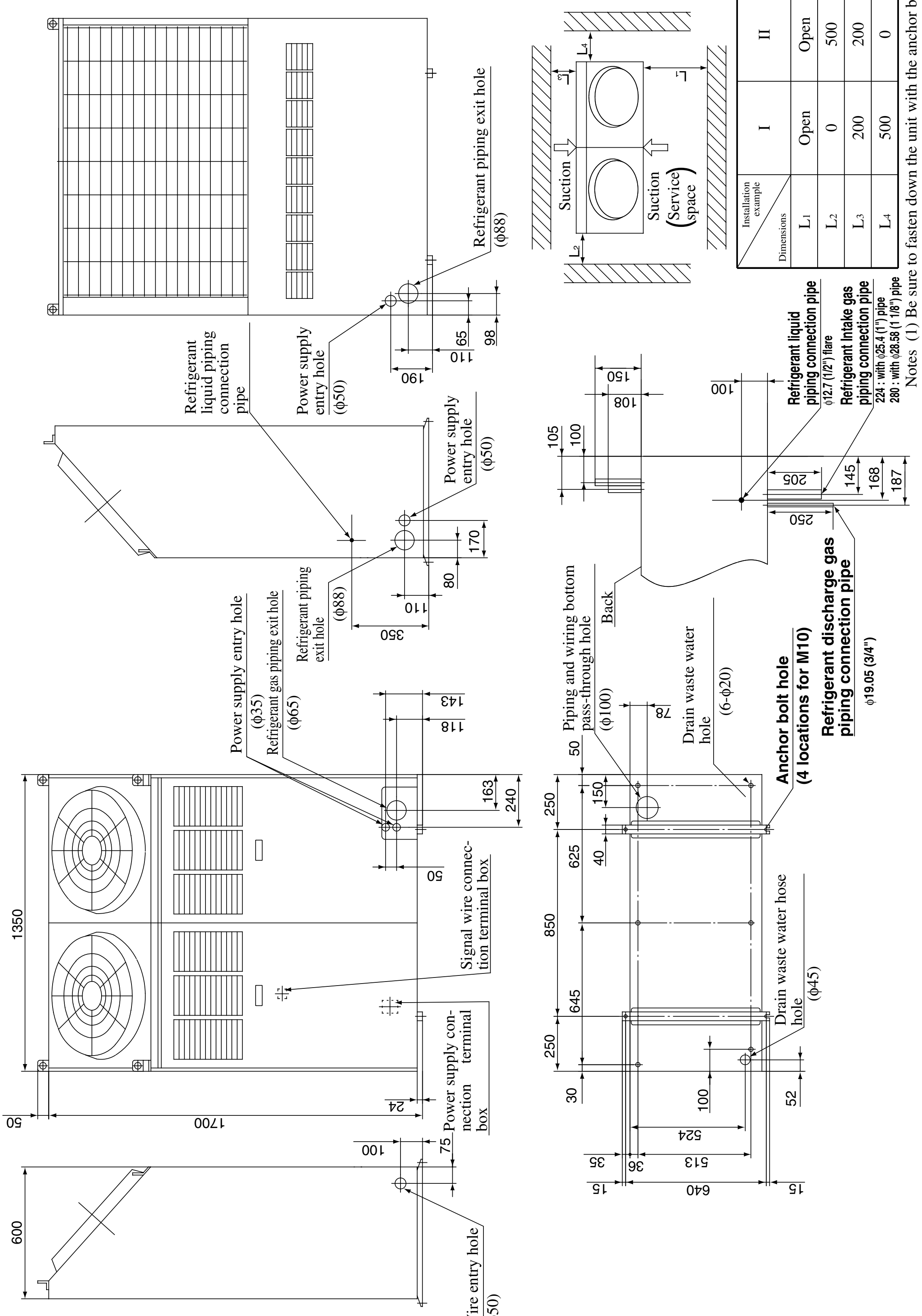


Different diameter adapter coupling				
For indoor gas piping	For indoor liquid piping	For outdoor intake gas piping	For outdoor dischage gas piping	For outdoor liquid piping
Quantity equal to the number of branches	Quantity equal to the number of branches	1 unit	1 unit	1 unit
OD15.88 ID12.7 ID19.05 A	OD9.52 ID6.35 B	OD25.4 ID19.05 C	OD19.05 ID15.88 D	OD12.7 ID9.52 E

(4) Outdoor unit

Models FDCP224HKXRE2A, 280HKXRE2A

FDCP224HKXRE2V, 280HKXRE2V



Unit: mm

Dimensions \ Installation example	I	II	III
L_1	Open	Open	500
L_2	0	500	500
L_3	200	200	200
L_4	500	0	500

Notes (1) Be sure to fasten down the unit with the anchor bolts.
(2) If in a location with strong winds, position the air discharge outlet perpendicular to the wind direction.
(3) Provide at least 1 m of space above the unit.

Dimensions after connecting included refrigerant piping

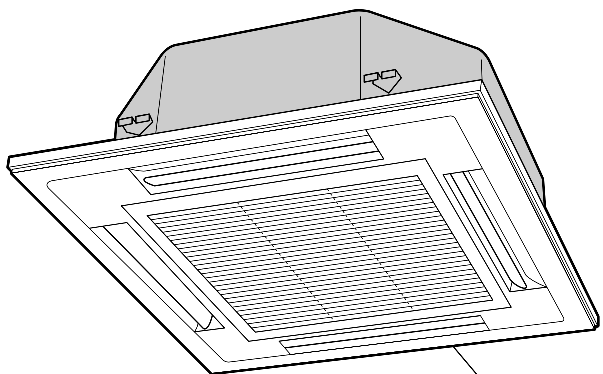
(Top view)

2.2.4 Exterior appearance

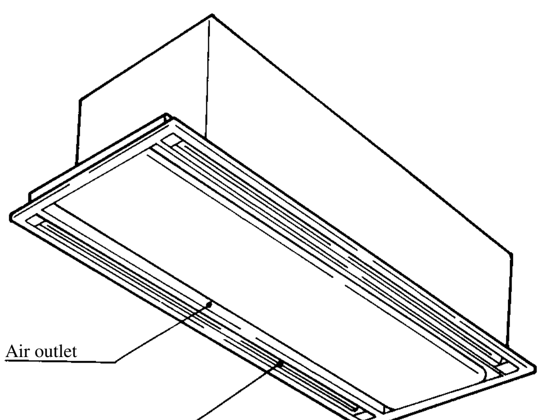
(1) Indoor unit

(a) Ceiling recessed type (FDT)

- Decorative panel



(b) 2-way outlet ceiling recessed type (FDTW)



- Decorative panel

(i) Standard type

Panel part No.	Type	Panel color	Applicable model
TW-PSA-22W-E	With Auto swing	Pearl white	FDTW28, 45, 56
TW-PSA-32W-E			FDTW71, 90
TW-PSA-42W-E			FDTW112, 140

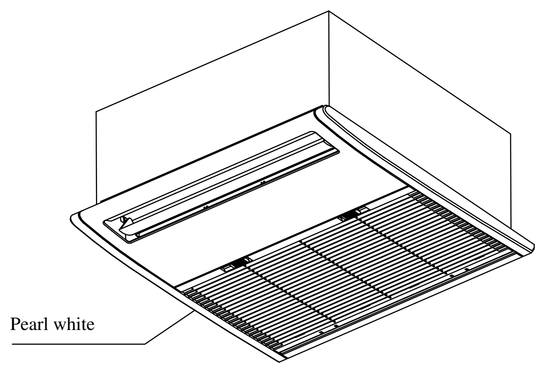
(ii)Attachment of ceiling material type

Panel part No.	Type	Panel color	Applicable model
TW-PSB-28W-E	With Auto swing	Misty white	FDTW28, 45, 56
TW-PSB-38W-E			FDTW71, 90
TW-PSB-48W-E			FDTW112, 140

(c) Ceiling recessed single air supply port type (FDTQ)

Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3

This illustration shows the direct blow panel (TQ-PSA-13W-E). Painting color is the same for other panels.

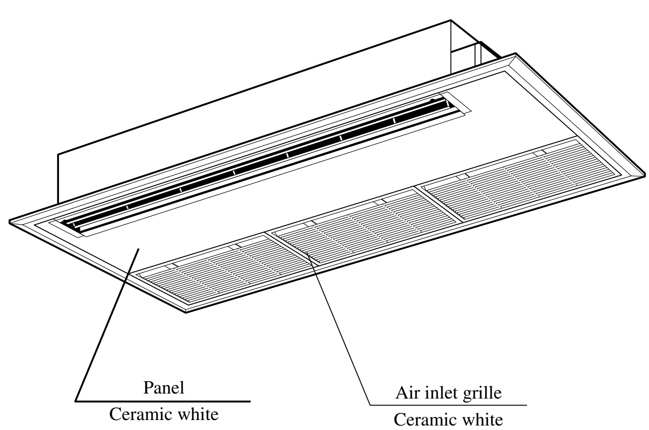


● Decorative panel

Panel part No.		Type	Panel color	Applicable model
Direct blow panel	TQ-PSA-13W-E	With Auto swing	Pearl white	FDTQ22, 28, 36
	TQ-PSB-13W-E			
Duct panel	QR-PNA-13W-E	Non Auto swing	Pearl white	FDTQ22, 28, 36
	QR-PNB-13W-E			

(d) 1-way outlet ceiling recessed type (FDTS)

Models FDTSJ45HKXE2, 71HKXE2

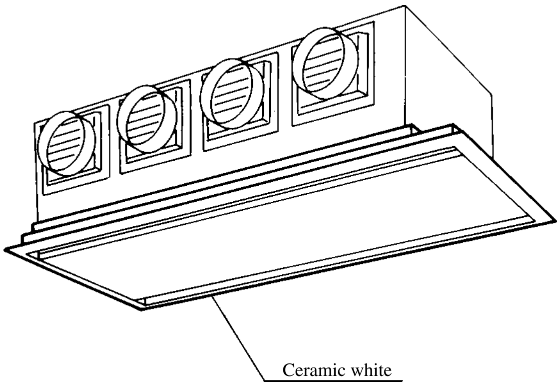


● Decorative panel

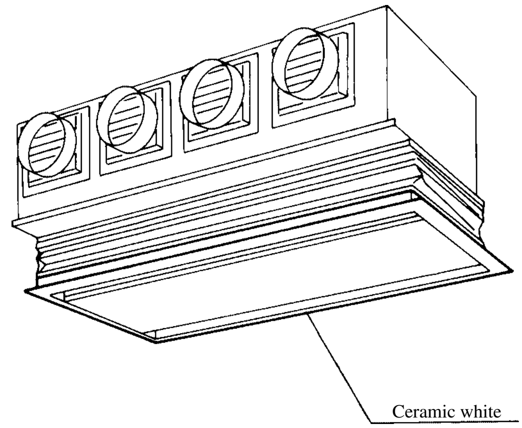
Panel part No.	Type	Panel color	Applicable model
TS-PSA-26W-E	With Auto swing	Ceramic white	FDTS45
TS-PSA-36W-E			FDTS71

(e) Cassetteria type (FDR)

Silent panel type



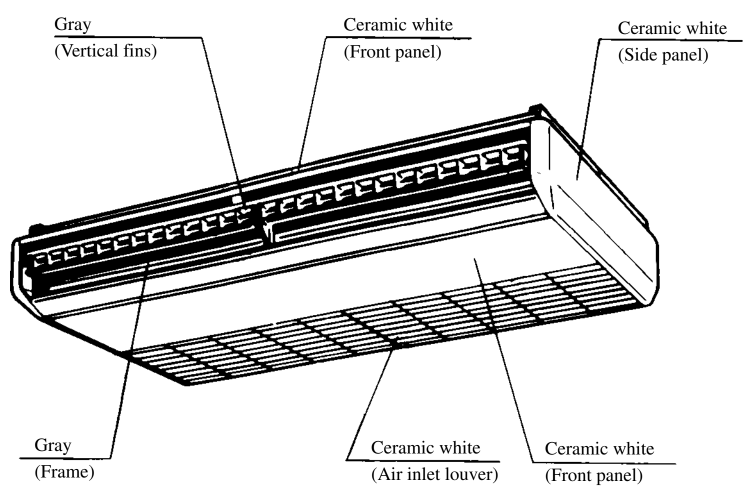
Canvas-duct panel type



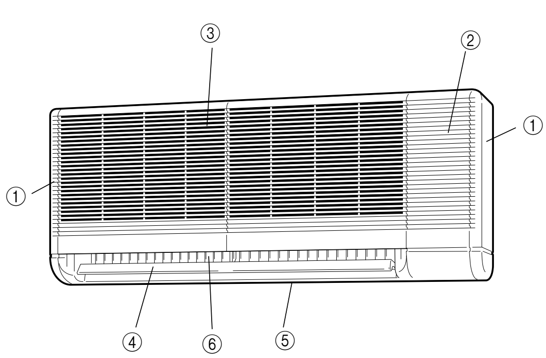
(f) Medium static pressure ducted type (FDQM) ....Zinc steel plate

(g) Satellite ducted type (FDUM) .... Zinc steel plate

(h) Ceiling suspension type (FDE)

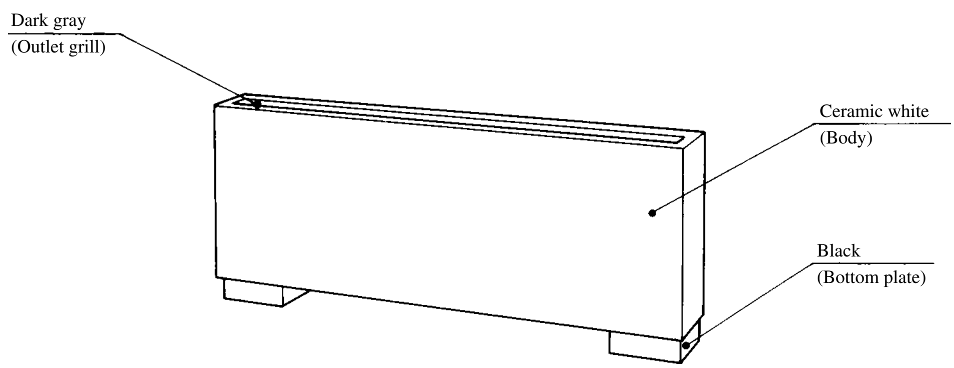


(i) Wall mounted type (FDK)



No.	Parts name	Color
①	Side plate	Ceramic white
②	Front panel	
③	Inlet grill	
④	Outlet grill	
⑤	Bottom plate	
⑥	Right and Left louvers	Light gray

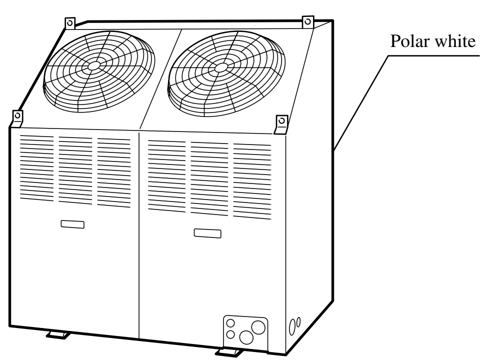
(j) **Floor standing exposed type (FDFL)**



(k) **Floor standing hidden type (FDFU) .... Zinc steel plate**

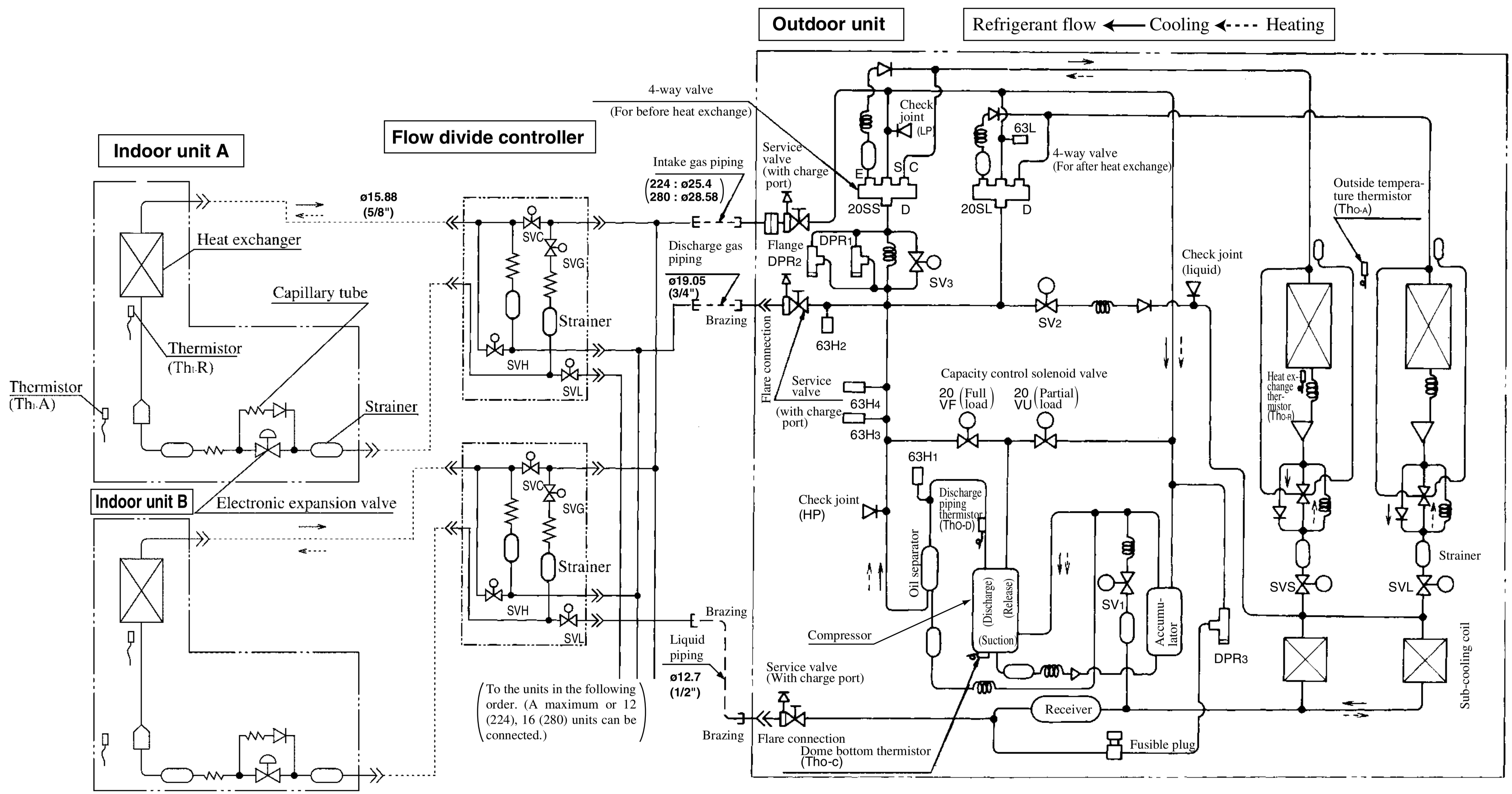
(2) Outdoor unit

Models FDCP224HKXRE2A, 280HKXRE2A
FDCP224HKXRE2V, 280HKXRE2V



2.2.5 Piping system

Models FDCP224HKXRE2A, 280HKXRE2A
FDCP224HKXRE2V, 280HKXRE2V



(1) Solenoid valve operation chart

	During compressor capacity control		During discharge temperature and dome bottom temperature control
	Full load	Partial load	
SV_1	—	—	Open
$20V_F$	Open	Closed	—
$20V_U$	Closed	Open	—

Note (1) The solenoid valve is open during magnetic inductance and closed when there is not magnetic inductance.

(2) Preset point of protective devices

$63H_1$: 3.24 open, 2.65 closed MPa [for protective]
$63H_2$: 2.26 open, 2.84 closed MPa [for high-pressure control (Hz decrease)]
$63H_3$: 2.50 open, 2.11 closed MPa [for high-pressure decrease control]
$63H_4$: 1.67 open, 1.86 closed MPa [for high-pressure increase control]
63L : 1.96 open, 2.75 closed MPa [for low-pressure increase control]
$DPR_{1,2}$: 1.77 open MPa **DPR_3** : 2.35 open MPa

(3) Function of thermistor

Tho-A : For low outside air cooling/heating, frost removal control
Tho-R : For frost removal control
Tho-D : For Discharge piping temperature control
Tho-C : For dome bottom temperature control
ThI-R : For fan control during heating
For frost prevention during cooling

(4) Flow divide controller solenoid valve action chart

	Power supply OFF	Power supply ON	Cooling[1]	Heating[1]	Blower	Detrost
SVH	Closed	Closed	Closed	Open	Closed	Closed
SVC	Closed	Open	Open	Closed	Open	Open

Note (1) Including for pauses, stops, and errors.

2.2.6 Selection chart

(1) Correct the cooling and heating capacity in accordance with the conditions as follows.The net cooling and heating capacity can be,obtained in the following way.

Indoor unit

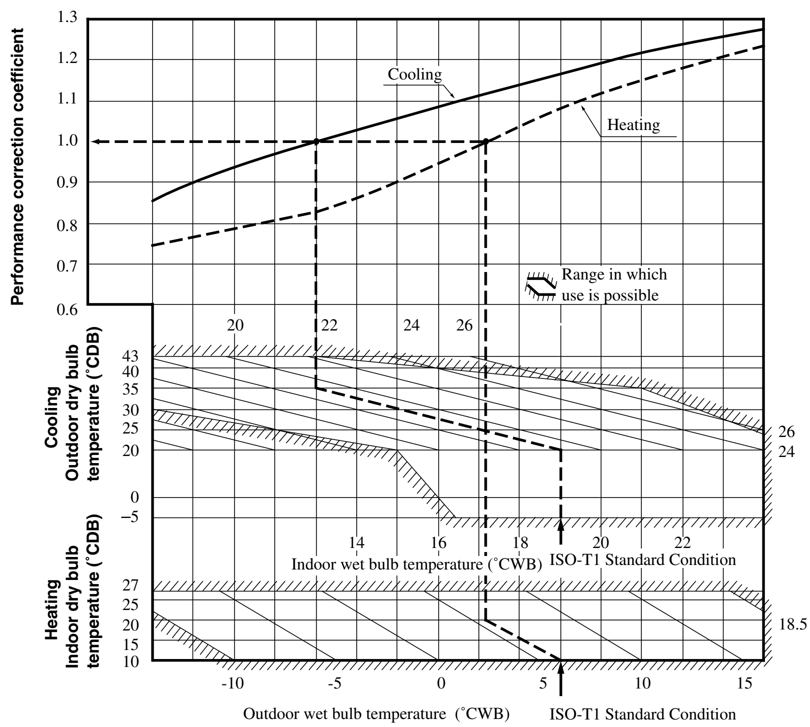
Each indoor unit = System performance × Indoor unit capacity / Indoor unit capacity when operating simultaneously.

Outdoor unit

System performance = Performance from connected capacity × correction coefficient from indoor and outdoor temperature conditions × (correction coefficient from piping distance − correction coefficient from mounting height difference between outdoor and indoor units) × (correction coefficient from condensation when heating).

Note: Refer to page 112 and 114 for the correction coefficient.

(a) Coefficient of cooling and heating capacity in relation to temperatures



(b) Correction of cooling and heating capacity in relation to one way length of refrigerant piping.

Equivalent piping length [m] (1)	5	10	15	20	25	30	35	40	45	50
Cooling	1.0	0.99	0.975	0.965	0.95	0.94	0.925	0.915	0.9	0.89
Heating	1.0	1.0	1.0	1.0	1.0	0.995	0.995	0.99	0.99	0.985

Equivalent piping length [m]	55	60	65	70	75	80	85	90	95	100
Cooling	0.875	0.865	0.85	0.84	0.825	0.815	0.8	0.79	0.775	0.765
Heating	0.985	0.98	0.98	0.975	0.975	0.97	0.97	0.965	0.965	0.96

Equivalent piping length [m]	105	110	115	120	125
Cooling	0.745	0.74	0.725	0.715	0.7
Heating	0.96	0.955	0.955	0.95	0.95

Note (1) Equivalent piping length can be obtained by calculating as follows.

Equivalent piping length = Real gas piping length + Number of bends in gas piping × Equivalent piping length of bends.

Equivalent length of each joint — Unit : m/one part

Gas piping size	ϕ12.7	ϕ15.88	ϕ19.05	ϕ25.4	ϕ28.58
Joint (90˚elbow)	0.10	0.10	0.15	0.15	0.20

(c) When the outdoor unit is located at a lower height than the indoor unit in cooling operation and when the outdoor unit is located at a higher height than the indoor unit in heating operation, the following values should be subtracvted from the values in the above table.

Height difference between the indoor unit and outdoor unit in the vertical height difference	5 m	10 m	15 m	20 m	25 m	30 m
Adjustment coefficient	0.01	0.02	0.03	0.04	0.05	0.06

Height difference between the indoor unit and outdoor unit in the vertical height difference	35 m	40 m	45 m	50 m
Adjustment coefficient	0.07	0.08	0.09	0.10

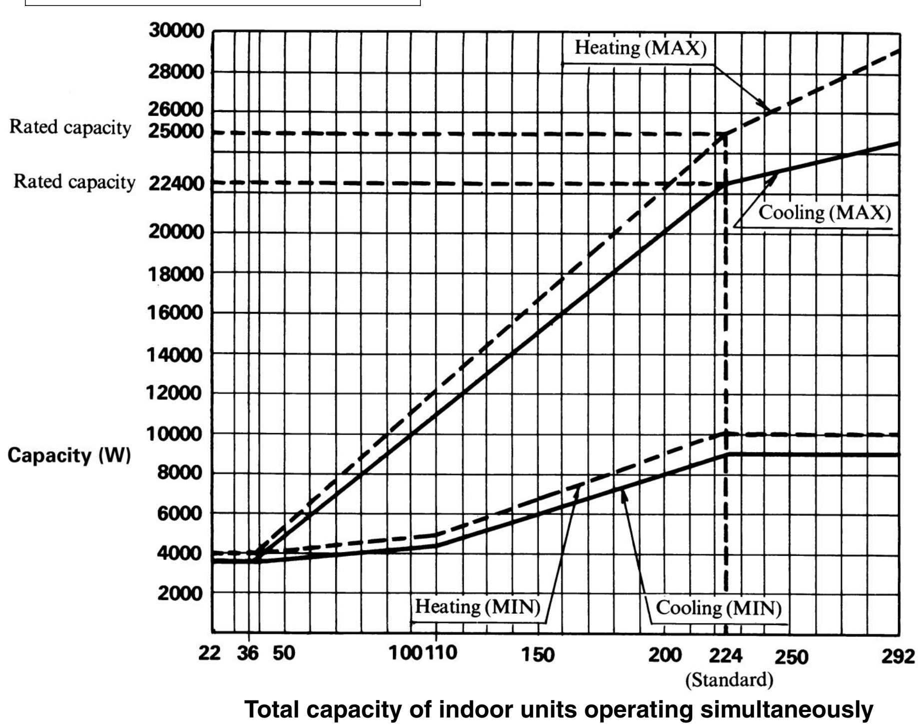
(d) Correction of heating capacity in relation to the frost on the outdoor unit heat exchanger

Air inlet temperature of outdoor unit in ˚C WB	-11	-9	-7	-5	-3	-1	1	3	5
Adjustment coefficient	0.95	0.94	0.93	0.91	0.88	0.86	0.87	0.92	1.00

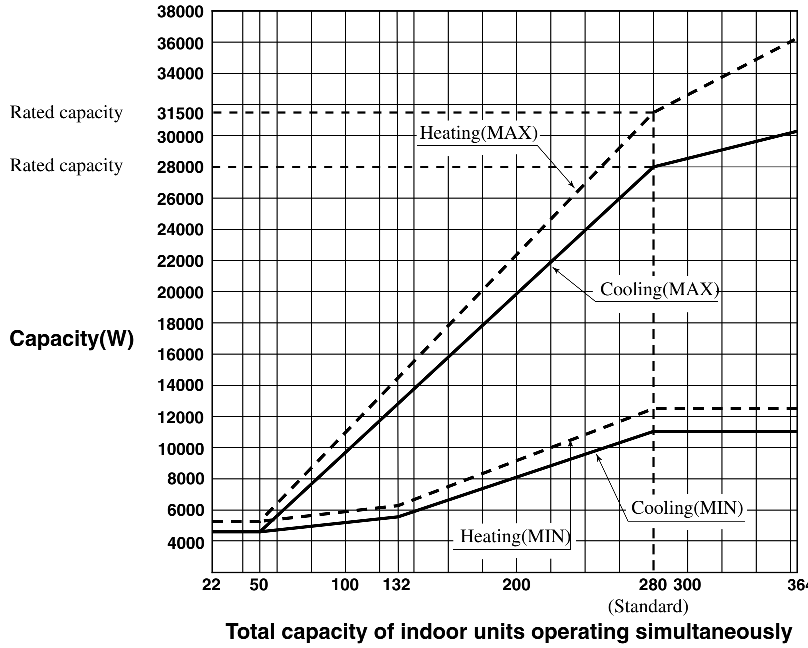
The correction factors will change drastically according to weather conditions. So necessary adjustment should be made empirically according to the weather data of the particulsr area.

(2) Correction of outdoor unit capacity according to capacity of indoor unit to be operated simultaneously

FDCP224HKXRE2A, 224HKXRE2V



FDCP280HKXRE2A, 280HKXRE2V



Capacity Correction Calculations (The procedure for both cooling and heating is the same.)

Example **Conditions**

- **Unit** (50 Hz)
  Outdoor unit FDCP280HKXRE2A 1 unit
  Indoor unit FDTJ90HKXE2 - 1 unit
  FDTJ140HKXE2 - 1 unit
  FDTWJ28HKXE2B - 1 unit
  FDTQJ22HKXE3 - 1 unit
- **Piping length** (Shall be common among units) ·········· 60 meters (suitable length)
- **Difference in height between indoor and outdoor units** ·········· 15 meters (Outdoor unit is lower)
- **Air conditions** ·········· Outdoor air temperature 33˚CDB
  Indoor temperature 26˚CDB 19 ˚CWB

Corrction when cooling?

Outdoor unit performance correction

① **Total connection capacity from indoor unit** ··· 90 × 1 unit + 140 × 1 unit + 28 × 1 unitt + 22 × 1 unit = 280
≒ 28kW (From figure above)

② **Performance correction from indoor and outdoor temperatures**
28 × 1.02 ≒ 28.5kW

③ **Performance correction from piping length and difference in height between indoor and outdoor units**
28.5 (0.865 - 0.03) ≒ **23.8kW** (Actual performance)

Performance correction of indoor unit

$$\text{Performance correction of indoor unit} = \text{System performance} \times \frac{\text{Indoor unit capacity}}{\text{Total capacity of indoor units operating simultaneously}}$$

[Example] FDTJ90HKXE2

$23.8 \times \frac{90}{280} ≒ 7.65\text{kW}$

Performance of indoor unit

FDTJ90HKXE2 ···················· 7.65kW (Actual performance)
FDTJ140HKXE2 ·················· 11.9kW (Actual performance)
FDTWJ28HKXE2B ·············· 2.38kW (Actual performance)
FDTQJ22HKXE3 ················ 1.87kW (Actual performance)

(3) Sensible heat capacity

(a) FDT Series

Model FDTJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	2.89	2.58	2.98	2.60	3.05	2.61	3.13	2.63	3.21	2.64	3.28	2.6
	29	2.83	2.55	2.91	2.57	2.99	2.59	3.07	2.61	3.15	2.62	3.22	2.6
	31	2.76	2.52	2.85	2.55	2.92	2.56	3.01	2.58	3.09	2.60	3.16	2.6
	33	2.68	2.49	2.77	2.52	2.86	2.54	2.95	2.56	3.02	2.58	3.10	2.5
	35	2.60	2.46	2.70	2.49	2.80	2.52	2.88	2.54	2.95	2.55	3.04	2.5
	37	2.53	2.43	2.63	2.46	2.72	2.49	2.81	2.51	2.89	2.53	2.98	2.5
	39	2.46	2.40	2.56	2.43	2.64	2.46	2.74	2.49	2.83	2.51	2.91	2.5

Model FDTJ36HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	3.72	3.19	3.83	3.22	3.93	3.24	4.02	3.25	4.12	3.27	4.21	3.2
	29	3.64	3.16	3.75	3.19	3.84	3.20	3.95	3.22	4.05	3.24	4.14	3.2
	31	3.55	3.12	3.66	3.15	3.76	3.17	3.87	3.20	3.97	3.21	4.06	3.2
	33	3.45	3.08	3.57	3.11	3.68	3.14	3.79	3.17	3.88	3.18	3.99	3.2
	35	3.35	3.04	3.47	3.08	3.60	3.11	3.71	3.14	3.80	3.15	3.91	3.1
	37	3.25	3.00	3.38	3.04	3.50	3.07	3.61	3.10	3.72	3.13	3.83	3.1
	39	3.16	2.96	3.29	3.00	3.40	3.04	3.52	3.07	3.64	3.10	3.75	3.1

Model FDTJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
15	27	4.65	3.99	4.78	4.02	4.91	4.05	5.03	4.07	5.15	4.09	5.27	4.1
	29	4.55	3.95	4.68	3.98	4.80	4.01	4.93	4.03	5.06	4.05	5.18	4.0
	31	4.44	3.90	4.58	3.94	4.70	3.97	4.83	3.99	4.96	4.02	5.08	4.0
	33	4.31	3.85	4.46	3.89	4.60	3.93	4.73	3.96	4.86	3.98	4.98	4.0
	35	4.19	3.80	4.34	3.85	4.50	3.89	4.64	3.92	4.75	3.94	4.88	3.9
	37	4.07	3.75	4.23	3.80	4.37	3.84	4.52	3.88	4.65	3.91	4.78	3.9
	39	3.95	3.71	4.11	3.76	4.25	3.80	4.40	3.84	4.55	3.87	4.68	3.9

Model FDTJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
15	27	5.78	4.48	5.95	4.51	6.11	4.53	6.26	4.54	6.41	4.55	6.55	4.5
	29	5.66	4.43	5.83	4.46	5.98	4.47	6.14	4.49	6.30	4.51	6.44	4.5
	31	5.52	4.36	5.70	4.40	5.85	4.42	6.01	4.44	6.18	4.46	6.32	4.4
	33	5.36	4.30	5.55	4.34	5.72	4.37	5.89	4.40	6.04	4.41	6.20	4.4
	35	5.21	4.23	5.40	4.28	5.60	4.32	5.77	4.35	5.91	4.36	6.08	4.3
	37	5.06	4.17	5.26	4.22	5.44	4.26	5.62	4.29	5.78	4.32	5.95	4.3
	39	4.92	4.10	5.11	4.16	5.29	4.19	5.48	4.24	5.66	4.27	5.83	4.2

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDTJ71KHXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
16	27	7.33	5.31	7.55	5.34	7.75	5.35	7.94	5.36	8.13	5.36	8.31	5.3
	29	7.18	5.24	7.39	5.27	7.58	5.28	7.78	5.29	7.99	5.30	8.17	5.3
	31	7.00	5.15	7.22	5.19	7.41	5.21	7.63	5.23	7.83	5.24	8.02	5.2
	33	6.80	5.06	7.04	5.11	7.26	5.14	7.47	5.16	7.66	5.17	7.86	5.1
	35	6.60	4.97	6.85	5.03	7.10	5.07	7.31	5.10	7.49	5.11	7.70	5.1
	37	6.42	4.89	6.67	4.95	6.90	4.99	7.13	5.02	7.33	5.04	7.55	5.0
	39	6.23	4.81	6.48	4.87	6.70	4.91	6.94	4.95	7.16	4.98	7.39	5.0

Model FDTJ90HKXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
21	27	9.30	6.82	9.57	6.85	9.82	6.87	10.06	6.88	10.31	6.89	10.53	6.8
	29	9.10	6.72	9.37	6.76	9.60	6.78	9.86	6.80	10.13	6.82	10.35	6.8
	31	8.87	6.62	9.15	6.67	9.40	6.69	9.67	6.72	9.93	6.74	10.16	6.7
	33	8.62	6.51	8.92	6.56	9.20	6.61	9.47	6.64	9.71	6.65	9.96	6.6
	35	8.37	6.39	8.69	6.46	9.00	6.52	9.27	6.56	9.50	6.57	9.77	6.5
	37	8.14	6.29	8.45	6.36	8.75	6.42	9.04	6.46	9.30	6.49	9.57	6.5
	39	7.90	6.19	8.22	6.26	8.50	6.31	8.80	6.37	9.10	6.42	9.37	6.4

Model FDTJ112HKXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.57	8.71	11.91	8.76	12.22	8.79	12.52	8.81	12.82	8.82	13.10	8.8
	29	11.32	8.60	11.66	8.65	11.95	8.68	12.28	8.71	12.60	8.74	12.88	8.7
	31	11.04	8.47	11.39	8.54	11.69	8.57	12.03	8.61	12.35	8.64	12.64	8.6
	33	10.73	8.33	11.10	8.41	11.45	8.47	11.78	8.51	12.08	8.54	12.40	8.5
	35	10.42	8.20	10.81	8.29	11.20	8.37	11.54	8.42	11.82	8.44	12.15	8.4
	37	10.12	8.07	10.52	8.16	10.89	8.24	11.24	8.30	11.57	8.34	11.91	8.3
	39	9.83	7.94	10.23	8.04	10.57	8.11	10.95	8.19	11.32	8.25	11.66	8.2

Model FDTJ140HKXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
30	27	14.46	10.29	14.88	10.34	15.27	10.36	15.65	10.37	16.03	10.37	16.38	10.3
	29	14.15	10.15	14.57	10.20	14.94	10.21	15.34	10.24	15.75	10.26	16.10	10.2
	31	13.80	9.98	14.24	10.04	14.62	10.07	15.04	10.11	15.44	10.13	15.81	10.1
	33	13.41	9.80	13.87	9.88	14.31	9.94	14.73	9.98	15.11	10.00	15.50	10.0
	35	13.02	9.62	13.51	9.72	14.00	9.81	14.42	9.85	14.77	9.86	15.19	9.8
	37	12.66	9.45	13.15	9.55	13.61	9.64	14.06	9.70	14.46	9.74	14.88	9.7
	39	12.29	9.28	12.78	9.40	13.22	9.47	13.69	9.55	14.15	9.62	14.57	9.6

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

(b) FDTS Series

Model FDTSJ45HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Model FDTSJ71HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

(c) FDR Series

Model FDRJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Model FDRJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	5.80	4.36	5.97	4.39	6.13	4.40	6.25	4.40	6.42	4.41	6.57	4.42
	29	5.67	4.30	5.84	4.33	6.00	4.35	6.15	4.36	6.28	4.36	6.45	4.37
	31	5.53	4.24	5.70	4.27	5.87	4.29	6.04	4.32	6.17	4.32	6.32	4.32
	33	5.39	4.18	5.57	4.21	5.73	4.24	5.90	4.26	6.07	4.28	6.19	4.28
	35	5.21	4.10	5.43	4.16	5.60	4.18	5.77	4.21	5.94	4.23	6.10	4.25
	37	5.07	4.04	5.25	4.08	5.47	4.13	5.63	4.16	5.80	4.18	5.97	4.20
	39	4.91	3.97	5.11	4.02	5.30	4.06	5.50	4.10	5.67	4.13	5.84	4.15

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDRJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Model FDRJ90HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
20	27	9.32	6.71	9.59	6.74	9.85	6.76	10.04	6.75	10.31	6.76	10.57	6.76
	29	9.11	6.61	9.38	6.64	9.65	6.67	9.88	6.68	10.10	6.67	10.37	6.69
	31	8.89	6.51	9.16	6.55	9.43	6.58	9.70	6.60	9.92	6.60	10.15	6.60
	33	8.66	6.40	8.95	6.45	9.22	6.49	9.49	6.52	9.76	6.54	9.95	6.53
	35	8.37	6.27	8.73	6.36	9.00	6.39	9.27	6.43	9.54	6.45	9.81	6.47
	37	8.15	6.17	8.44	6.23	8.78	6.30	9.05	6.34	9.32	6.37	9.59	6.39
	39	7.88	6.05	8.21	6.13	8.51	6.19	8.84	6.25	9.11	6.28	9.38	6.31

Model FDRJ112HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.60	8.72	11.94	8.77	12.25	8.80	12.50	8.80	12.84	8.83	13.15	8.84
	29	11.33	8.60	11.67	8.66	12.01	8.70	12.30	8.72	12.57	8.72	12.90	8.75
	31	11.07	8.48	11.40	8.54	11.74	8.59	12.07	8.63	12.34	8.64	12.63	8.65
	33	10.77	8.35	11.13	8.42	11.47	8.48	11.80	8.52	12.14	8.56	12.39	8.56
	35	10.42	8.20	10.86	8.31	11.20	8.37	11.54	8.42	11.87	8.46	12.21	8.49
	37	10.15	8.08	10.51	8.16	10.93	8.26	11.27	8.31	11.60	8.36	11.94	8.39
	39	9.81	7.93	10.21	8.04	10.60	8.12	11.00	8.20	11.33	8.26	11.67	8.30

Model FDRJ140HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
34	27	14.50	10.78	14.92	10.84	15.32	10.88	15.62	10.87	16.04	10.90	16.44	10.91
	29	14.17	10.63	14.59	10.69	15.01	10.75	15.37	10.77	15.71	10.77	16.13	10.80
	31	13.83	10.48	14.25	10.55	14.67	10.60	15.09	10.65	15.43	10.66	15.79	10.67
	33	13.47	10.31	13.92	10.40	14.34	10.46	14.76	10.52	15.18	10.56	15.48	10.56
	35	13.02	10.12	13.58	10.26	14.00	10.32	14.42	10.38	14.84	10.43	15.26	10.47
	37	12.68	9.97	13.13	10.07	13.66	10.19	14.08	10.25	14.50	10.30	14.92	10.35
	39	12.26	9.78	12.77	9.91	13.24	10.01	13.75	10.12	14.17	10.18	14.59	10.23

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

(d) FDUM Series

Model FDUMJ36HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	3.73	3.20	3.84	3.22	3.94	3.24	4.02	3.25	4.13	3.27	4.23	3.28
	29	3.64	3.16	3.75	3.19	3.86	3.21	3.95	3.23	4.04	3.24	4.15	3.26
	31	3.56	3.13	3.66	3.15	3.77	3.18	3.88	3.20	3.97	3.21	4.06	3.23
	33	3.46	3.09	3.58	3.12	3.69	3.15	3.79	3.17	3.90	3.19	3.98	3.20
	35	3.35	3.04	3.49	3.08	3.60	3.11	3.71	3.14	3.82	3.16	3.92	3.18
	37	3.26	3.01	3.38	3.04	3.51	3.08	3.62	3.11	3.73	3.13	3.84	3.15
	39	3.15	2.96	3.28	3.00	3.41	3.04	3.54	3.07	3.64	3.10	3.75	3.12

Model FDUMJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Model FDUMJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	5.80	4.36	5.97	4.39	6.13	4.40	6.25	4.40	6.42	4.41	6.57	4.42
	29	5.67	4.30	5.84	4.33	6.00	4.35	6.15	4.36	6.28	4.36	6.45	4.37
	31	5.53	4.24	5.70	4.27	5.87	4.29	6.04	4.32	6.17	4.32	6.32	4.32
	33	5.39	4.18	5.57	4.21	5.73	4.24	5.90	4.26	6.07	4.28	6.19	4.28
	35	5.21	4.10	5.43	4.16	5.60	4.18	5.77	4.21	5.94	4.23	6.10	4.25
	37	5.07	4.04	5.25	4.08	5.47	4.13	5.63	4.16	5.80	4.18	5.97	4.20
	39	4.91	3.97	5.11	4.02	5.30	4.06	5.50	4.10	5.67	4.13	5.84	4.15

Model FDUMJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDUMJ90HKXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
20	27	9.32	6.71	9.59	6.74	9.85	6.76	10.04	6.75	10.31	6.76	10.57	6.76
	29	9.11	6.61	9.38	6.64	9.65	6.67	9.88	6.68	10.10	6.67	10.37	6.69
	31	8.89	6.51	9.16	6.55	9.43	6.58	9.70	6.60	9.92	6.60	10.15	6.60
	33	8.66	6.40	8.95	6.45	9.22	6.49	9.49	6.52	9.76	6.54	9.95	6.53
	35	8.37	6.27	8.73	6.36	9.00	6.39	9.27	6.43	9.54	6.45	9.81	6.47
	37	8.15	6.17	8.44	6.23	8.78	6.30	9.05	6.34	9.32	6.37	9.59	6.39
	39	7.88	6.05	8.21	6.13	8.51	6.19	8.84	6.25	9.11	6.28	9.38	6.31

Model FDUMJ112HKXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.60	8.72	11.94	8.77	12.25	8.80	12.50	8.80	12.84	8.83	13.15	8.84
	29	11.33	8.60	11.67	8.66	12.01	8.70	12.30	8.72	12.57	8.72	12.90	8.75
	31	11.07	8.48	11.40	8.54	11.74	8.59	12.07	8.63	12.34	8.64	12.63	8.65
	33	10.77	8.35	11.13	8.42	11.47	8.48	11.80	8.52	12.14	8.56	12.39	8.56
	35	10.42	8.20	10.86	8.31	11.20	8.37	11.54	8.42	11.87	8.46	12.21	8.49
	37	10.15	8.08	10.51	8.16	10.93	8.26	11.27	8.31	11.60	8.36	11.94	8.39
	39	9.81	7.93	10.21	8.04	10.60	8.12	11.00	8.20	11.33	8.26	11.67	8.30

Model FDUMJ140HKXE2

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
34	27	14.50	10.78	14.92	10.84	15.32	10.88	15.62	10.87	16.04	10.90	16.44	10.91
	29	14.17	10.63	14.59	10.69	15.01	10.75	15.37	10.77	15.71	10.77	16.13	10.80
	31	13.83	10.48	14.25	10.55	14.67	10.60	15.09	10.65	15.43	10.66	15.79	10.67
	33	13.47	10.31	13.92	10.40	14.34	10.46	14.76	10.52	15.18	10.56	15.48	10.56
	35	13.02	10.12	13.58	10.26	14.00	10.32	14.42	10.38	14.84	10.43	15.26	10.47
	37	12.68	9.97	13.13	10.07	13.66	10.19	14.08	10.25	14.50	10.30	14.92	10.35
	39	12.26	9.78	12.77	9.91	13.24	10.01	13.75	10.12	14.17	10.18	14.59	10.23

(e) FDE Series

Model FDEJ36HKXE2B

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	3.73	3.34	3.84	3.36	3.94	3.39	4.02	3.40	4.13	3.42	4.23	3.44
	29	3.64	3.30	3.75	3.33	3.86	3.36	3.95	3.38	4.04	3.39	4.15	3.41
	31	3.56	3.26	3.66	3.30	3.77	3.32	3.88	3.35	3.97	3.37	4.06	3.38
	33	3.46	3.23	3.58	3.26	3.69	3.29	3.79	3.32	3.90	3.34	3.98	3.35
	35	3.35	3.18	3.49	3.23	3.60	3.26	3.71	3.29	3.82	3.31	3.92	3.34
	37	3.26	3.15	3.38	3.18	3.51	3.23	3.62	3.26	3.73	3.28	3.84	3.31
	39	3.15	3.10	3.28	3.15	3.41	3.19	3.54	3.23	3.64	3.25	3.75	3.28

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDEJ45HKXE2B

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Model FDEJ56HKXE2B

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	5.80	4.36	5.97	4.39	6.13	4.40	6.25	4.40	6.42	4.41	6.57	4.42
	29	5.67	4.30	5.84	4.33	6.00	4.35	6.15	4.36	6.28	4.36	6.45	4.37
	31	5.53	4.24	5.70	4.27	5.87	4.29	6.04	4.32	6.17	4.32	6.32	4.32
	33	5.39	4.18	5.57	4.21	5.73	4.24	5.90	4.26	6.07	4.28	6.19	4.28
	35	5.21	4.10	5.43	4.16	5.60	4.18	5.77	4.21	5.94	4.23	6.10	4.25
	37	5.07	4.04	5.25	4.08	5.47	4.13	5.63	4.16	5.80	4.18	5.97	4.20
	39	4.91	3.97	5.11	4.02	5.30	4.06	5.50	4.10	5.67	4.13	5.84	4.15

Model FDEJ71HKXE2B

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Model FDEJ112HKXE2B

Air flow (m³/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
28	27	11.60	8.72	11.94	8.77	12.25	8.80	12.50	8.80	12.84	8.83	13.15	8.84
	29	11.33	8.60	11.67	8.66	12.01	8.70	12.30	8.72	12.57	8.72	12.90	8.75
	31	11.07	8.48	11.40	8.54	11.74	8.59	12.07	8.63	12.34	8.64	12.63	8.65
	33	10.77	8.35	11.13	8.42	11.47	8.48	11.80	8.52	12.14	8.56	12.39	8.56
	35	10.42	8.20	10.86	8.31	11.20	8.37	11.54	8.42	11.87	8.46	12.21	8.49
	37	10.15	8.08	10.51	8.16	10.93	8.26	11.27	8.31	11.60	8.36	11.94	8.39
	39	9.81	7.93	10.21	8.04	10.60	8.12	11.00	8.20	11.33	8.26	11.67	8.30

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDEJ140HKXE2B

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	27	14.50	10.78	14.92	10.84	15.32	10.88	15.62	10.87	16.04	10.90	16.44	10.91
	29	14.17	10.63	14.59	10.69	15.01	10.75	15.37	10.77	15.71	10.77	16.13	10.80
	31	13.83	10.48	14.25	10.55	14.67	10.60	15.09	10.65	15.43	10.66	15.79	10.67
34	33	13.47	10.31	13.92	10.40	14.34	10.46	14.76	10.52	15.18	10.56	15.48	10.56
	35	13.02	10.12	13.58	10.26	14.00	10.32	14.42	10.38	14.84	10.43	15.26	10.47
	37	12.68	9.97	13.13	10.07	13.66	10.19	14.08	10.25	14.50	10.30	14.92	10.35
	39	12.26	9.78	12.77	9.91	13.24	10.01	13.75	10.12	14.17	10.18	14.59	10.23

(f) FDK Series

Model FDKJ22HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	27	2.27	2.04	2.34	2.06	2.40	2.08	2.46	2.09	2.52	2.10	2.57	2.11
	29	2.22	2.02	2.29	2.04	2.35	2.06	2.41	2.07	2.48	2.08	2.53	2.09
	31	2.17	2.00	2.24	2.02	2.30	2.04	2.36	2.05	2.43	2.07	2.48	2.08
9	33	2.11	1.98	2.18	2.00	2.25	2.02	2.31	2.03	2.37	2.05	2.44	2.06
	35	2.05	1.95	2.12	1.98	2.20	2.00	2.27	2.02	2.32	2.03	2.39	2.04
	37	1.99	1.93	2.07	1.95	2.14	1.98	2.21	2.00	2.27	2.01	2.34	2.03
	39	1.93	1.91	2.01	1.93	2.08	1.95	2.15	1.98	2.22	2.00	2.29	2.01

Model FDKJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	27	2.90	2.58	2.98	2.60	3.06	2.62	3.12	2.63	3.21	2.64	3.29	2.66
	29	2.83	2.55	2.92	2.57	3.00	2.59	3.07	2.61	3.14	2.62	3.23	2.64
	31	2.77	2.52	2.85	2.55	2.93	2.57	3.02	2.59	3.09	2.60	3.16	2.61
10	33	2.69	2.49	2.78	2.52	2.87	2.54	2.95	2.56	3.04	2.58	3.10	2.59
	35	2.60	2.46	2.72	2.49	2.80	2.52	2.88	2.54	2.97	2.56	3.05	2.58
	37	2.54	2.43	2.63	2.46	2.73	2.49	2.82	2.52	2.90	2.54	2.98	2.55
	39	2.45	2.40	2.55	2.43	2.65	2.46	2.75	2.49	2.83	2.51	2.92	2.53

Model FDKJ36HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
	27	3.73	2.93	3.84	2.95	3.94	2.96	4.02	2.97	4.13	2.98	4.23	2.98
	29	3.64	2.89	3.75	2.91	3.86	2.93	3.95	2.94	4.04	2.95	4.15	2.96
	31	3.56	2.86	3.66	2.88	3.77	2.90	3.88	2.91	3.97	2.92	4.06	2.93
10	33	3.46	2.82	3.58	2.84	3.69	2.86	3.79	2.88	3.90	2.89	3.98	2.90
	35	3.35	2.77	3.49	2.81	3.60	2.83	3.71	2.85	3.82	2.86	3.92	2.88
	37	3.26	2.73	3.38	2.76	3.51	2.79	3.62	2.81	3.73	2.83	3.84	2.85
	39	3.15	2.68	3.28	2.72	3.41	2.75	3.54	2.78	3.64	2.80	3.75	2.82

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Model FDKJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11.5	27	4.66	3.54	4.80	3.56	4.92	3.57	5.02	3.57	5.16	3.58	5.28	3.59
	29	4.55	3.49	4.69	3.51	4.82	3.53	4.94	3.54	5.05	3.54	5.18	3.55
	31	4.45	3.44	4.58	3.46	4.72	3.48	4.85	3.50	4.96	3.51	5.08	3.51
	33	4.33	3.39	4.47	3.42	4.61	3.44	4.74	3.46	4.88	3.47	4.98	3.47
	35	4.19	3.33	4.37	3.37	4.50	3.40	4.64	3.42	4.77	3.43	4.91	3.45
	37	4.08	3.28	4.22	3.31	4.39	3.35	4.53	3.37	4.66	3.39	4.80	3.41
	39	3.94	3.22	4.10	3.26	4.26	3.30	4.42	3.33	4.55	3.35	4.69	3.37

Model FDKJ56HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
17	27	5.80	4.75	5.97	4.78	6.13	4.81	6.25	4.82	6.42	4.84	6.57	4.86
	29	5.67	4.69	5.84	4.73	6.00	4.76	6.15	4.78	6.28	4.79	6.45	4.81
	31	5.53	4.64	5.70	4.67	5.87	4.71	6.04	4.74	6.17	4.75	6.32	4.77
	33	5.39	4.57	5.57	4.62	5.73	4.65	5.90	4.69	6.07	4.71	6.19	4.72
	35	5.21	4.50	5.43	4.56	5.60	4.60	5.77	4.64	5.94	4.66	6.10	4.69
	37	5.07	4.44	5.25	4.49	5.47	4.55	5.63	4.59	5.80	4.62	5.97	4.65
	39	4.91	4.37	5.11	4.43	5.30	4.48	5.50	4.54	5.67	4.57	5.84	4.60

Model FDKJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
21	27	7.36	5.95	7.57	5.99	7.77	6.02	7.92	6.03	8.14	6.06	8.34	6.07
	29	7.19	5.87	7.40	5.92	7.61	5.96	7.80	5.98	7.97	5.99	8.18	6.02
	31	7.01	5.80	7.23	5.85	7.44	5.89	7.65	5.93	7.82	5.94	8.01	5.96
	33	6.83	5.72	7.06	5.78	7.27	5.82	7.48	5.86	7.70	5.89	7.85	5.90
	35	6.60	5.63	6.89	5.71	7.10	5.75	7.31	5.80	7.53	5.83	7.74	5.86
	37	6.43	5.56	6.66	5.62	6.93	5.69	7.14	5.73	7.36	5.77	7.57	5.81
	39	6.22	5.47	6.48	5.54	6.72	5.61	6.97	5.67	7.19	5.71	7.40	5.75

(g) FDFL, FDFU Series

Models FDFLJ28HKXE2, FDFUJ28HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
12	27	2.90	2.58	2.98	2.60	3.06	2.62	3.12	2.63	3.21	2.64	3.29	2.66
	29	2.83	2.55	2.92	2.57	3.00	2.59	3.07	2.61	3.14	2.62	3.23	2.64
	31	2.77	2.52	2.85	2.55	2.93	2.57	3.02	2.59	3.09	2.60	3.16	2.61
	33	2.69	2.49	2.78	2.52	2.87	2.54	2.95	2.56	3.04	2.58	3.10	2.59
	35	2.60	2.46	2.72	2.49	2.80	2.52	2.88	2.54	2.97	2.56	3.05	2.58
	37	2.54	2.43	2.63	2.46	2.73	2.49	2.82	2.52	2.90	2.54	2.98	2.55
	39	2.45	2.40	2.55	2.43	2.65	2.46	2.75	2.49	2.83	2.51	2.92	2.53

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

SHC : Sensible heat capacity (kW)

Models FDFLJ45HKXE2, FDFUJ45HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
14	27	4.66	3.86	4.80	3.89	4.92	3.91	5.02	3.92	5.16	3.94	5.28	3.95
	29	4.55	3.82	4.69	3.85	4.82	3.87	4.94	3.89	5.05	3.90	5.18	3.92
	31	4.45	3.77	4.58	3.80	4.72	3.83	4.85	3.85	4.96	3.87	5.08	3.88
	33	4.33	3.72	4.47	3.76	4.61	3.79	4.74	3.81	4.88	3.84	4.98	3.85
	35	4.19	3.66	4.37	3.71	4.50	3.75	4.64	3.77	4.77	3.80	4.91	3.82
	37	4.08	3.62	4.22	3.66	4.39	3.70	4.53	3.73	4.66	3.76	4.80	3.78
	39	3.94	3.56	4.10	3.61	4.26	3.65	4.42	3.69	4.55	3.72	4.69	3.75

Models FDFLJ71HKXE2, FDFUJ71HKXE2

Air flow (m^3/min)	Outdoor air temp. (°CDB)	Indoor air temperature											
		17.0°CWB		18.0°CWB		19.0°CWB		20.0°CWB		21.0°CWB		22.0°CWB	
		TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
18	27	7.36	5.56	7.57	5.59	7.77	5.61	7.92	5.61	8.14	5.63	8.34	5.64
	29	7.19	5.49	7.40	5.52	7.61	5.55	7.80	5.56	7.97	5.57	8.18	5.58
	31	7.01	5.41	7.23	5.45	7.44	5.48	7.65	5.50	7.82	5.51	8.01	5.52
	33	6.83	5.33	7.06	5.37	7.27	5.41	7.48	5.44	7.70	5.46	7.85	5.46
	35	6.60	5.23	6.89	5.30	7.10	5.34	7.31	5.37	7.53	5.40	7.74	5.42
	37	6.43	5.15	6.66	5.21	6.93	5.27	7.14	5.30	7.36	5.33	7.57	5.36
	39	6.22	5.06	6.48	5.13	6.72	5.18	6.97	5.24	7.19	5.27	7.40	5.30

Note (1) Symbols are as follows :

TC : Total cooling capacity (kW)

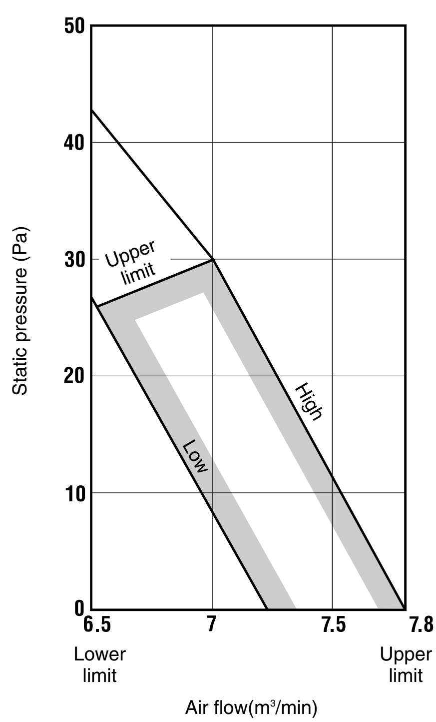
SHC : Sensible heat capacity (kW)

2.2.7 Characteristics of fan

(1) Ceiling recessed single air supply port type (FDTQ)

(Only when FDTQJ22, 28 and 36 model are used for the Duct panel type.)

Models FDTQ22, 28, 36HKXE3



(2) Cassetteria type (FDR)

- External static pressure table

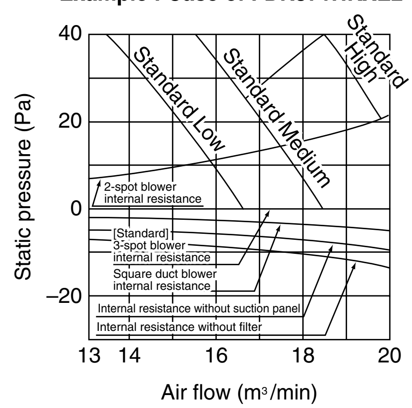
Unit : Pa

Duct specs. / Air flow (m^3/min) / model		1 spot (1) closing		Standard (2)		Square duct (3)	
		Stan-dard	High(4) speed	Stan-dard	High(4) speed	Stan-dard	High(4) speed
FDR45 56	14	-	-	50	85	50	90
FDR71	18	30	65	45	80	50	85
FDR90	20	25	60	45	80	50	85
FDR112	28	40	70	50	80	55	85
FDR140	34	40	70	50	80	55	85

Notes (1) 1 spot closing: Round duct flange at center is removed and shield with a special panel (option).
(2) Standard: Ø200 duct are installed at all blowout holes.
(3) Square duct: All round ducts are removed and replaced with special square duct flanges (option).
(4) When operating at a high speed, invert the connection of white and red connectors on the flank of control box.

How to interpret the blower characteristics table

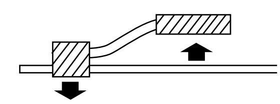
Example : Case of FDRJ71HKXE2



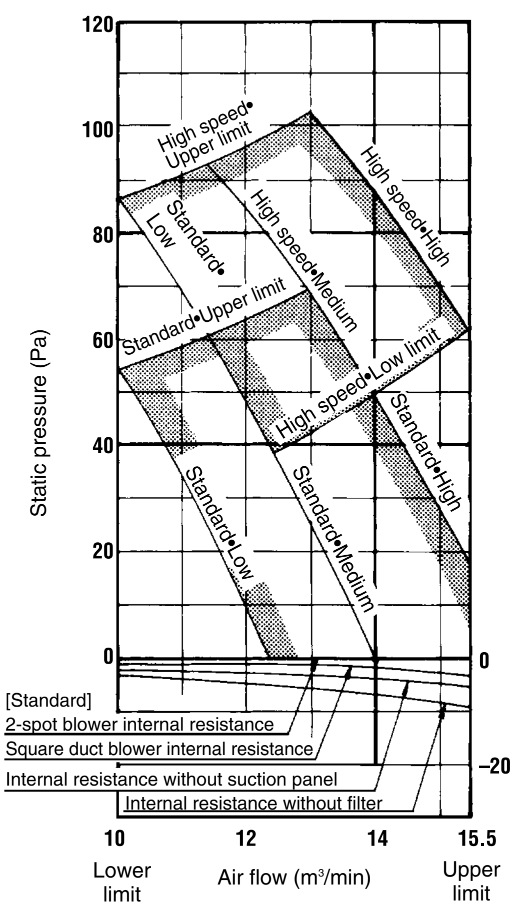
① **2-spot blowout....................**
Internal resistance increases more than the standard 3-spot blowout. Approx. 14 Pa at 17m³/min

② **Square duct blowout...........**
Internal resistance decreases more than the standard round duct (ø200 3-spot). 3 Pa at 17 m³/nin. (External static pressure increases in reverse.)

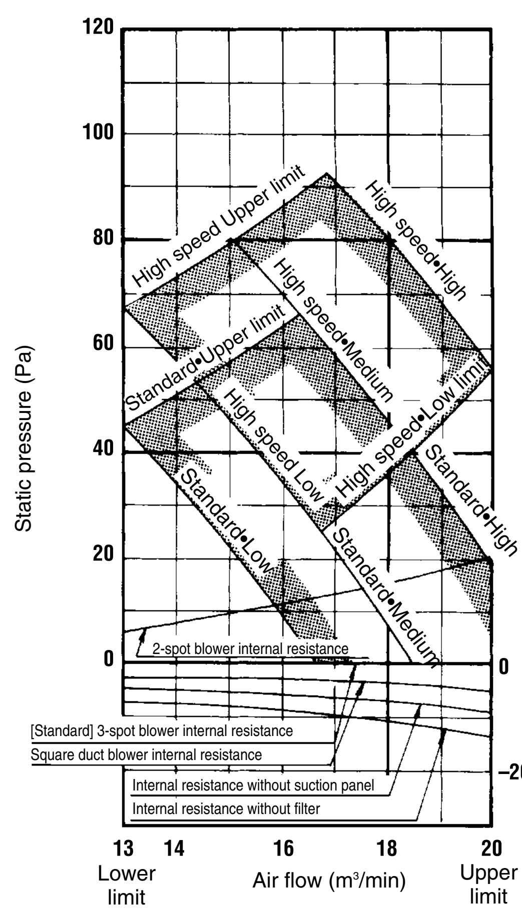
③ **Suction panel......................**
When the suction panel is not used with the ceiling return type, the part of internal resistance related to the panel decrease. 3 Pa (= 0.6–0.3) at 17mm³/min.



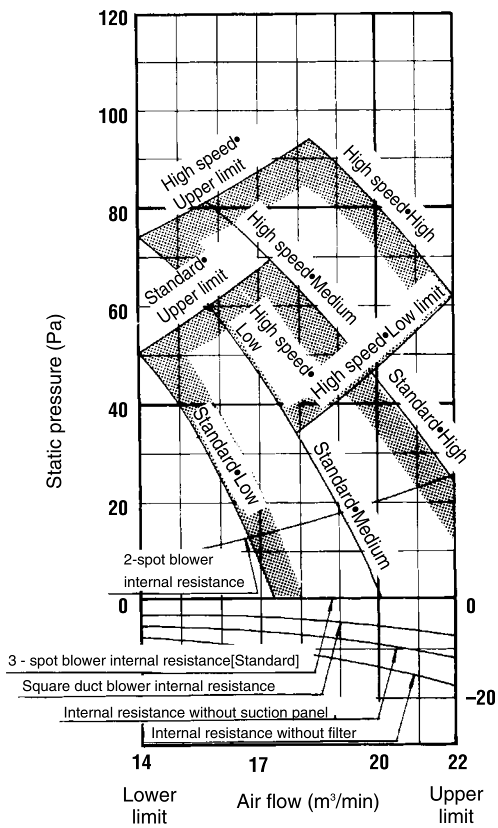
Models FDRJ45HKXE2, 56HKXE2



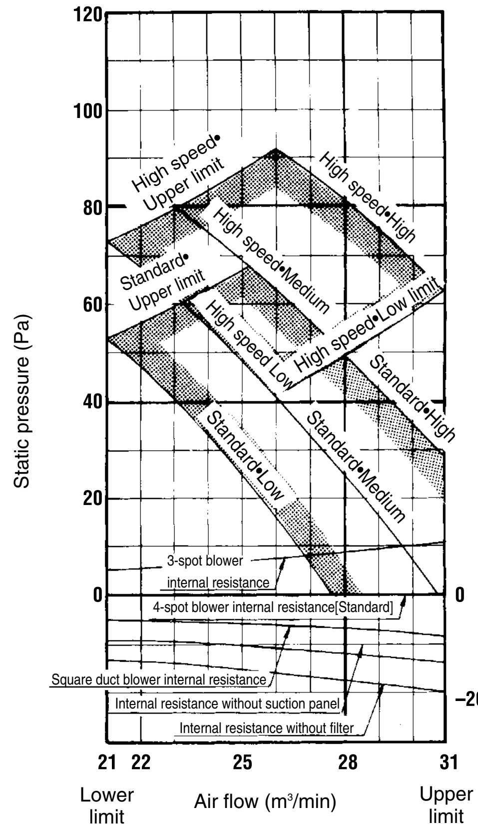
Model FDRJ71HKXE2



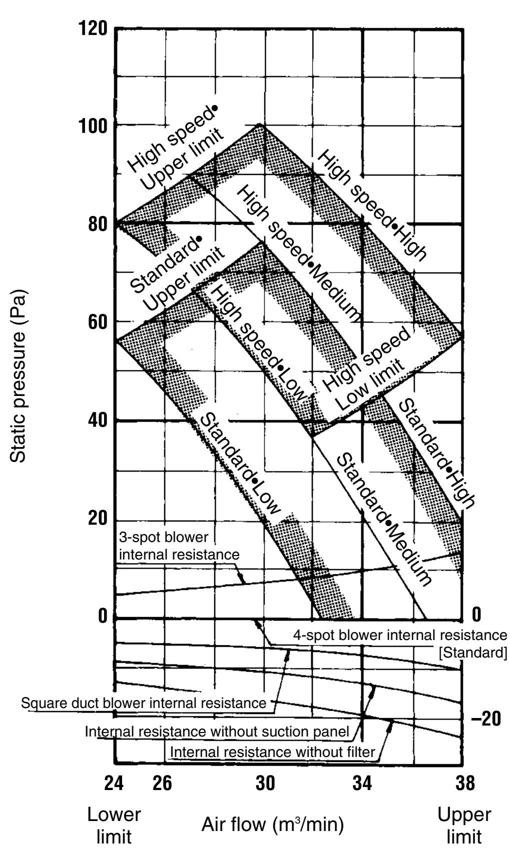
Model FDRJ90HKXE2



Model FDRJ112HKXE2



Model FDRJ140HKXE2



(3) Medium static pressure ducted type (FDQM) Satellite ducted type (FDUM)

- External static pressure table

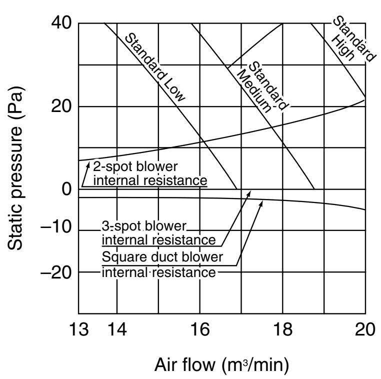
Unit : Pa

Model	Air flow (m^3/min)	1 spot closing: Stan-dard	1 spot closing: High(4) speed	Standard: Stan-dard	Standard: High(4) speed	Square duct: Stan-dard	Square duct: High(1) speed
FDQM36		-	-	-	-	30	-
FDUM36 type	12	-	-	50	85	50	90
FDUM45 56	14	-	-	50	85	50	90
FDUM71	18	35	70	50	85	55	90
FDUM90	20	30	65	50	85	55	90
FDUM112	28	50	80	60	90	65	95
FDUM140	34	50	75	60	85	65	95

Note (1) For high speed operation, insert the white connector and the red connector beside the control box in other places respectively.

How to interpret the blower characteristics table

Example : Case of FDUMJ71HKXE2



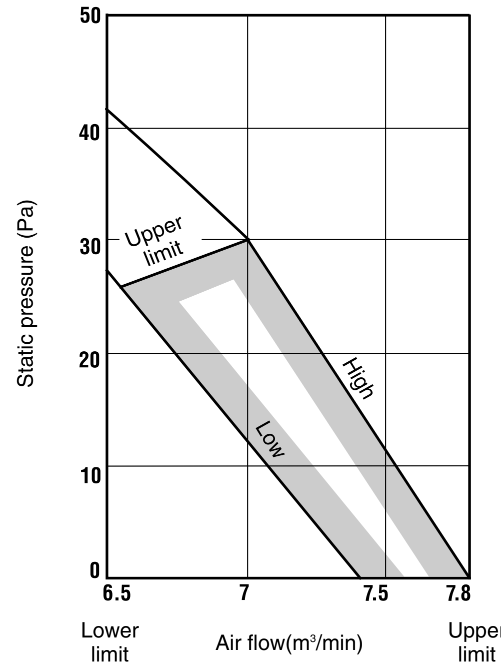
1 **2-spot blowout....................**

Internal resistance increases more than the standard 3-spot blowout. Approx. 14Pa at 17m^3/min

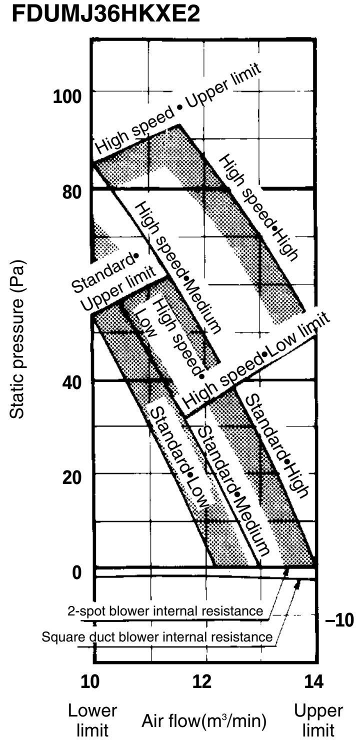
2 **Square duct blowout..........**

Internal resistance decreases more than the standard round duct (ø200 3-spot). 3Pa at 17 m^3/min. (External static pressure increases in reverse.)

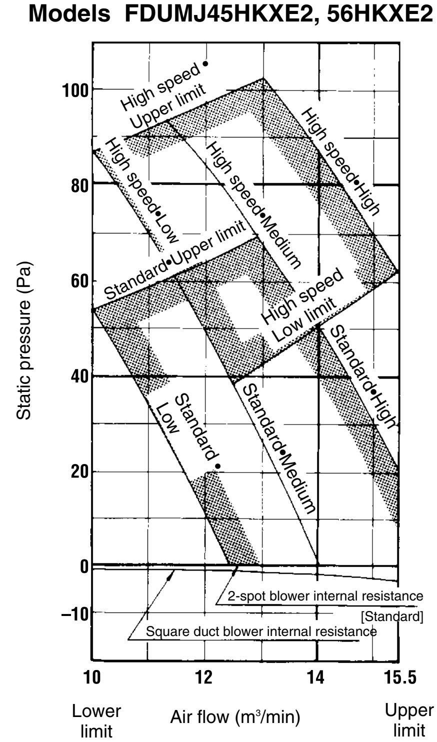
Model FDQMJ36HKXE3



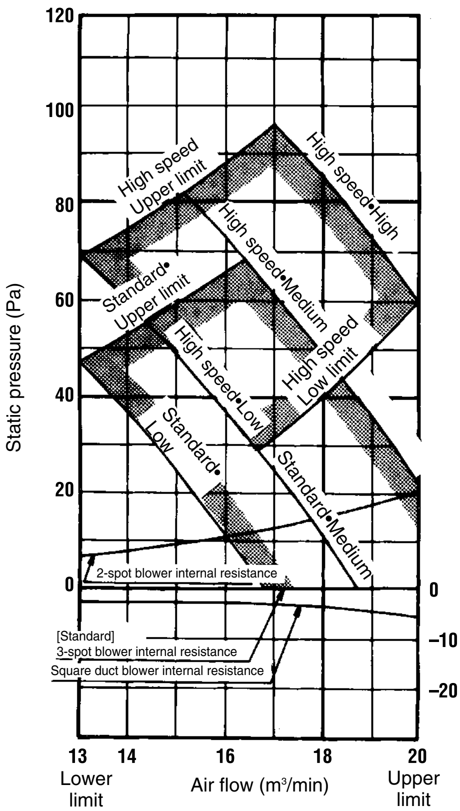
Model FDUMJ36HKXE2



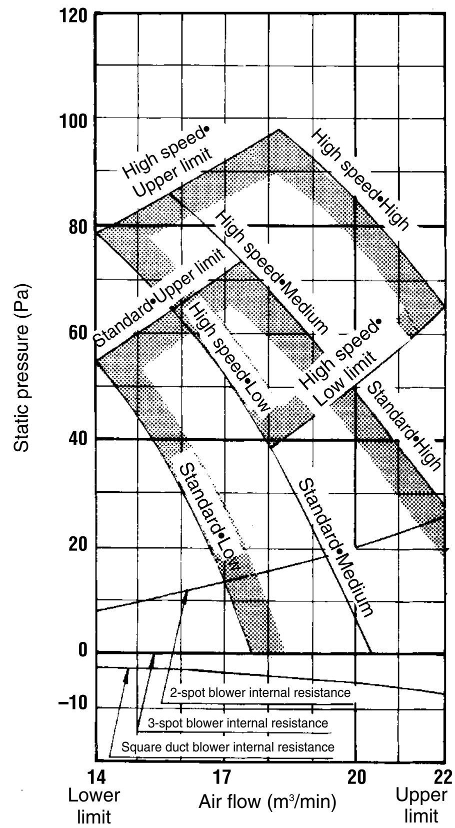
Models FDUMJ45HKXE2, 56HKXE2



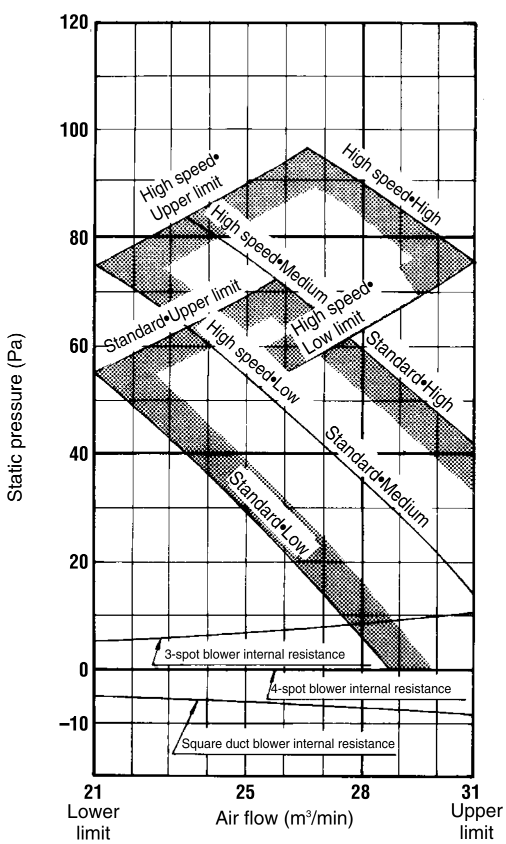
Model FDUMJ71HKXE2



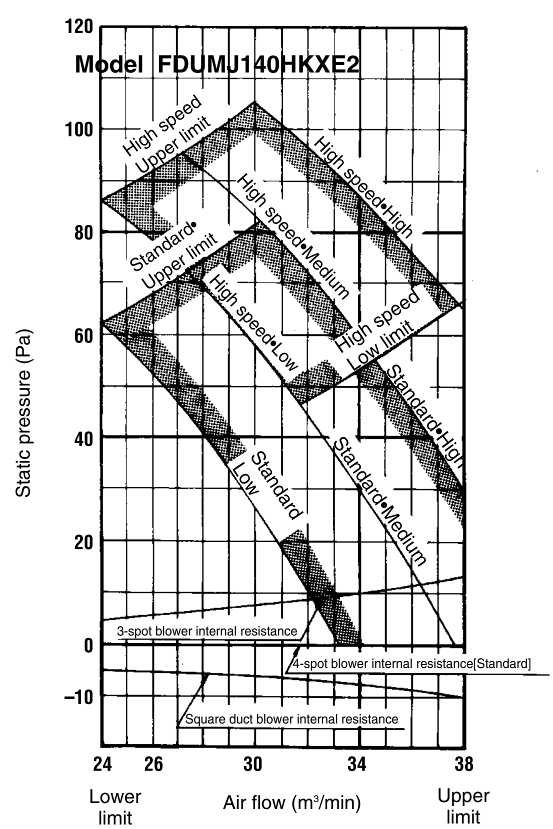
Model FDUMJ90HKXE2



Model FDUMJ112HKXE2



Model FDUMJ140HKXE2



2.2.8 Noise level

Note (1) The data are based on the following conditions.

Ambient air tempetature: Indoor unit 27˚C DB, 19˚C WB. Outdoor unit 35˚C DB

(2) The data in the chart are measuted in an unechonic room.

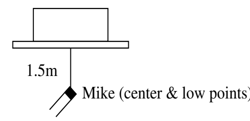
(3) The noise levels measured in the field are usually higher than the data because of reflection.

(1) Indoor unit

(a) Ceiling recessed type (FDT)

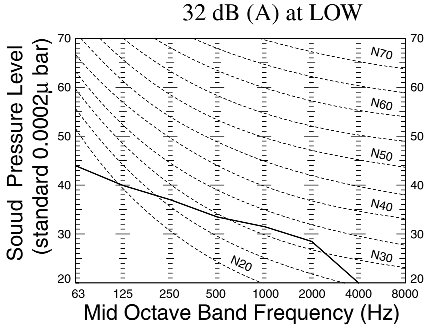
Measured based on JIS B 8616

Mike position as below



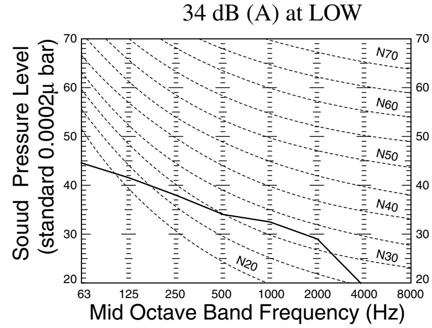
Models FDTJ28HKXE2,36HKXE2

Noise level 36 dB (A) at HIGH
34 dB (A) at MEDIUM
32 dB (A) at LOW



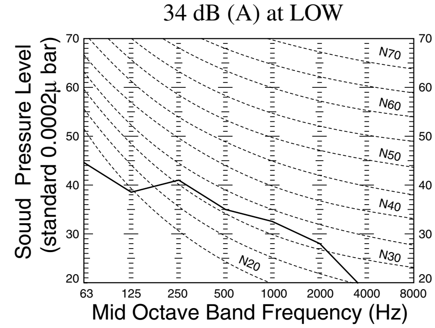
Models FDTJ45HKXE2,56HKXE2

Noise level 37 dB (A) at HIGH
35 dB (A) at MEDIUM
34 dB (A) at LOW



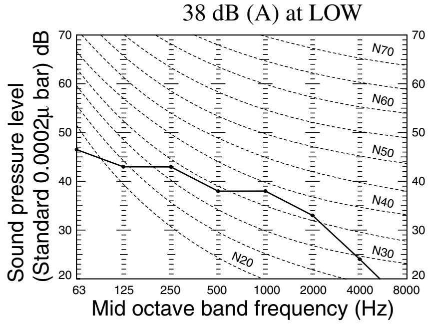
Model FDTJ71HKXE2

Noise level 38 dB (A) at HIGH
36 dB (A) at MEDIUM
34 dB (A) at LOW



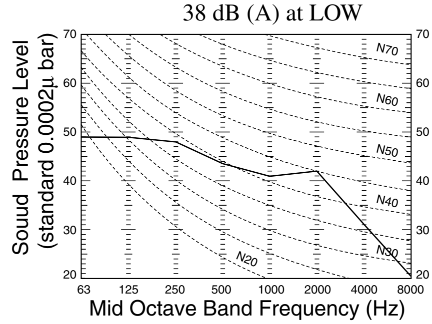
Model FDTJ90HKXE2

Noise level 42 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



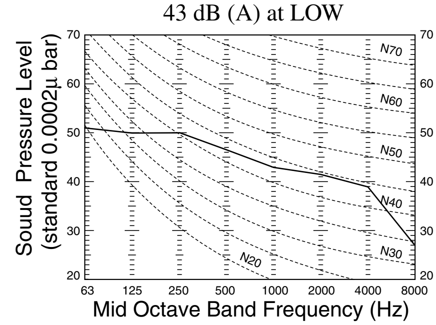
Model FDTJ112HKXE2

Noise level 47 dB (A) at HIGH
43 dB (A) at MEDIUM
38 dB (A) at LOW



Model FDTJ140HKXE2

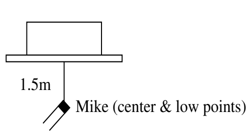
Noise level 49 dB (A) at HIGH
46 dB (A) at MEDIUM
43 dB (A) at LOW



(b) 2-way outlet ceiling recessed type (FDTW)

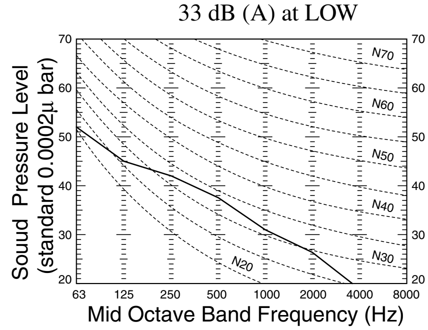
Measured based on JIS B 8616

Mike position as below



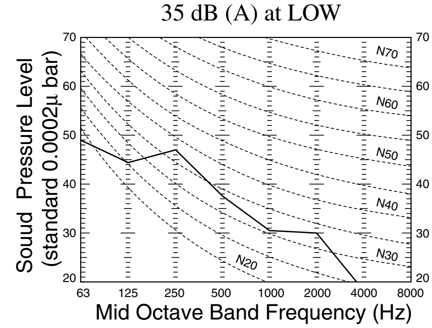
Models FDTWJ28HKXE2B, 45HKXE2B 56HKXE2B

Noise level 39 dB (A) at HIGH
36 dB (A) at MEDIUM
33 dB (A) at LOW



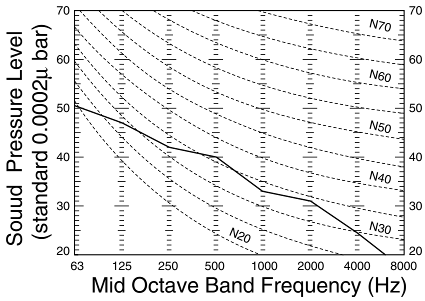
Model FDTWJ71HKXE2B

Noise level 41 dB (A) at HIGH
38 dB (A) at MEDIUM
35 dB (A) at LOW



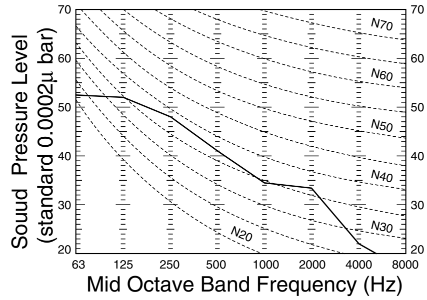
Model FDTWJ90HKXE2B

Noise level 41 dB (A) at HIGH
39 dB (A) at MEDIUM
36 dB (A) at LOW



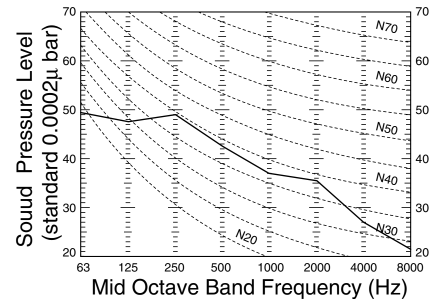
Model FDTWJ112HKXE2B

Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
38 dB (A) at LOW



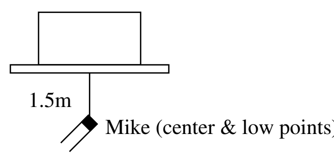
Model FDTWJ140HKXE2B

Noise level 45 dB (A) at HIGH
42 dB (A) at MEDIUM
39 dB (A) at LOW



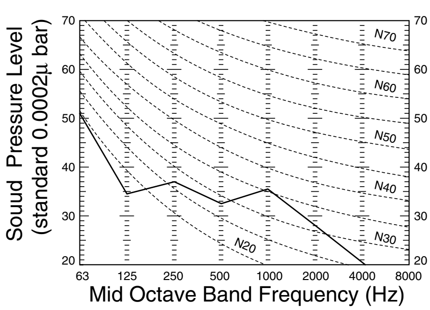
(c) Ceiling recessed single air supply port type (FDTQ)
1-way outlet ceiling recessed type (FDTS)

Measured based on JIS B 8616
Mike position as right



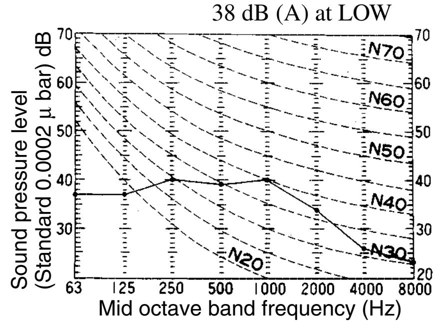
Models FDTQJ22HKXE3, 28HKXE3
36HKXE3

Noise level 38 dB (A) at HIGH
33 dB (A) at LOW



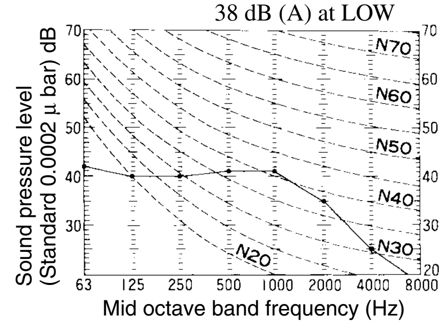
Model FDTSJ45HKXE2B

Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



Model FDTSJ71HKXE2B

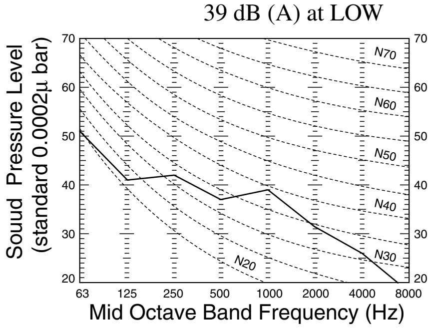
Noise level 44 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



When used as the Duct panel type

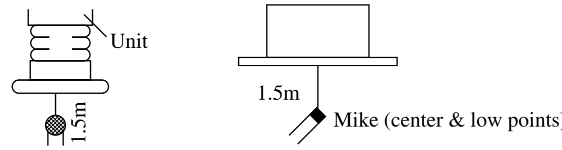
Models FDTQJ22HKXE3, 28HKXE3
36HKXE3

Noise level 42 dB (A) at HIGH
39 dB (A) at LOW



(d) Cassetteria type (FDR)

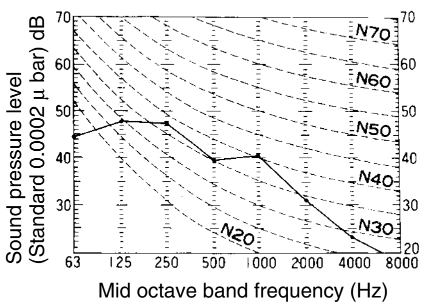
Measured based on JIS B 8616
Mike position as right



(i) Canvas duct Panel type

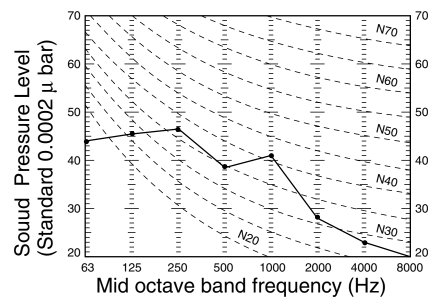
Models FDRJ45HKXE2, 56HKXE2

Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
38 dB (A) at LOW



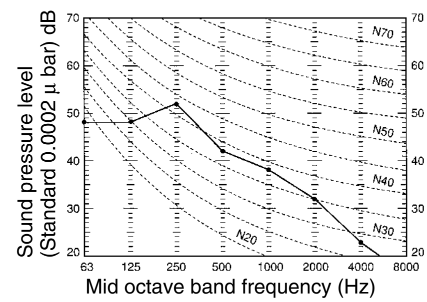
Models FDRJ71HKXE2, 90HKXE2

Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
38 dB (A) at LOW



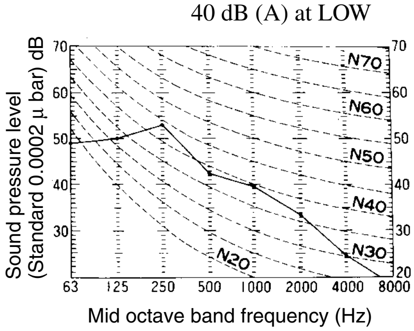
Model FDRJ112HKXE2

Noise level 46 dB (A) at HIGH
43 dB (A) at MEDIUM
39 dB (A) at LOW



Model FDRJ140HKXE2

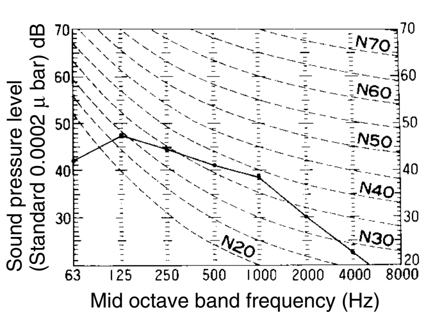
Noise level 47 dB (A) at HIGH
44 dB (A) at MEDIUM
40 dB (A) at LOW



(ii)Silent Panel type

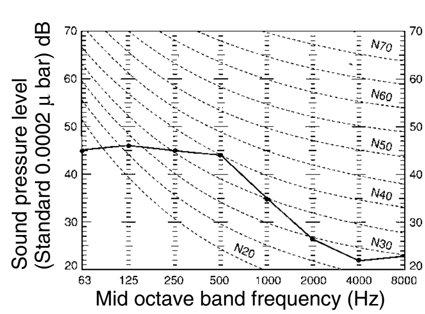
Models FDRJ45HKXE2, 56HKXE2

Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW



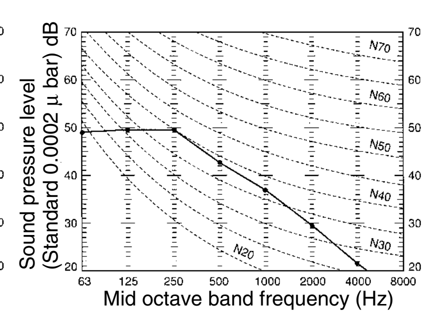
Models FDRJ71HKXE2, 90HKXE2

Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW



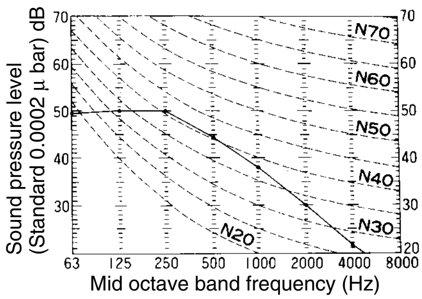
Model FDRJ112HKXE2

Noise level 45 dB (A) at HIGH
42 dB (A) at MEDIUM
38 dB (A) at LOW



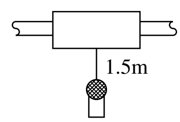
Model FDRJ140HKXE2

Noise level 46 dB (A) at HIGH
43 dB (A) at MEDIUM
39 dB (A) at LOW



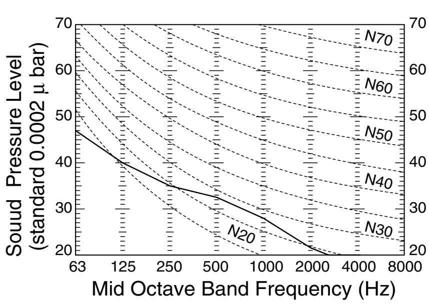
(e) Medium static pressure ducted type (FDQM)
Satellite ducted type (FDUM)

Measured based on JIS B 8616
Mike position as right



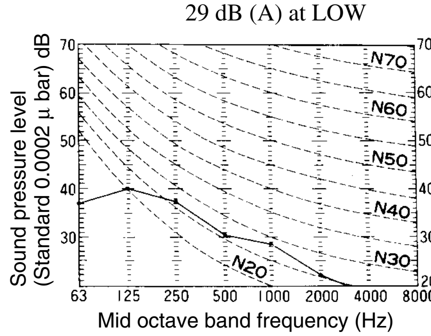
Model FDQMJ36HKXE3

Noise level 34 dB (A) at HIGH
31 dB (A) at LOW



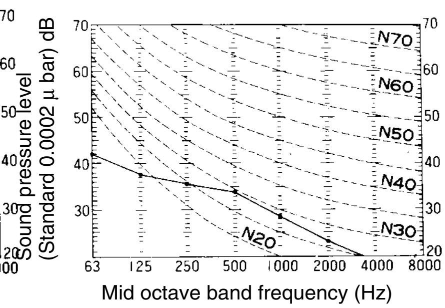
Model FDUMJ36HKXE2

Noise level 34 dB (A) at HIGH
32 dB (A) at MEDIUM
29 dB (A) at LOW



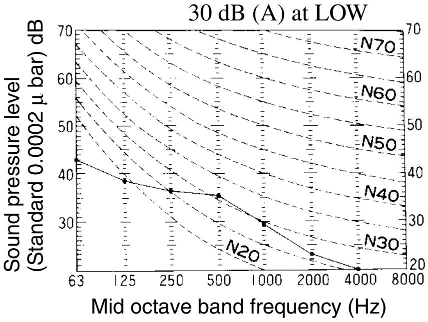
Models FDUMJ45HKXE2, 56HKXE2
71HKXE2

Noise level 35 dB (A) at HIGH
32 dB (A) at MEDIUM
29 dB (A) at LOW



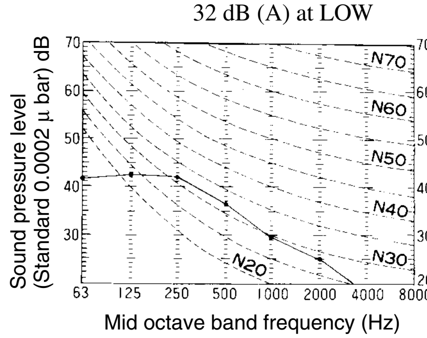
Model FDUMJ90HKXE2

Noise level 36 dB (A) at HIGH
33 dB (A) at MEDIUM
30 dB (A) at LOW



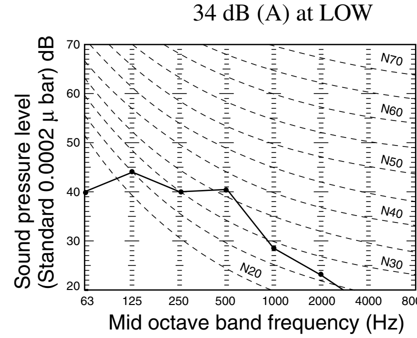
Model FDUMJ112HKXE2

Noise level 38 dB (A) at HIGH
35 dB (A) at MEDIUM
32 dB (A) at LOW



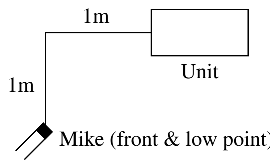
Model FDUMJ140HKXE2

Noise level 39 dB (A) at HIGH
37 dB (A) at MEDIUM
34 dB (A) at LOW



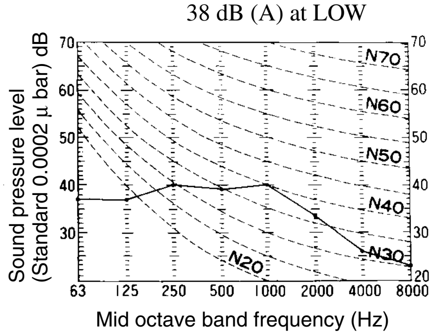
(f) Ceiling suspension type (FDE)

Measured based on JIS B 8616
Mike position as right



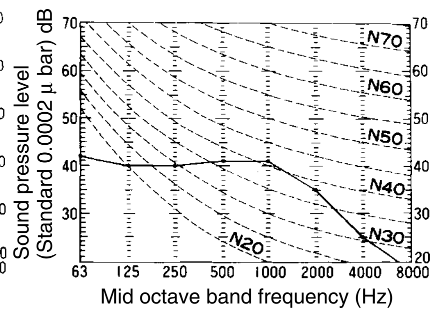
Models FDEJ36HKXE2B, 45HKXE2B 56HKXE2B

Noise level 43 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



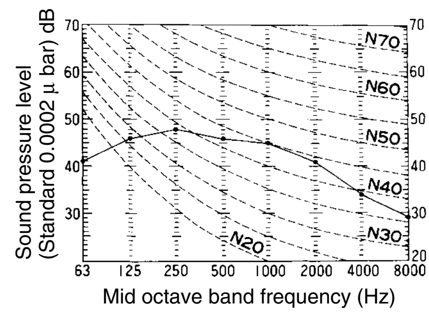
Model FDEJ71HKXE2B

Noise level 44 dB (A) at HIGH
40 dB (A) at MEDIUM
38 dB (A) at LOW



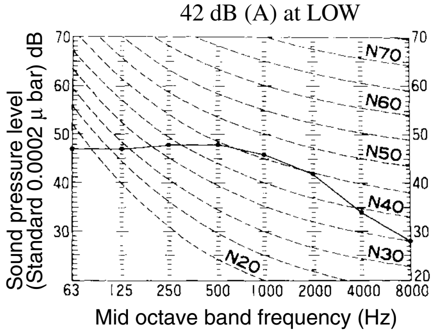
Model FDEJ112HKXE2B

Noise level 49 dB (A) at HIGH
46 dB (A) at MEDIUM
42 dB (A) at LOW



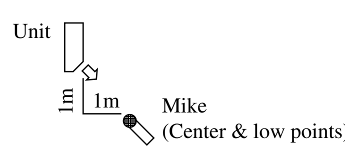
Model FDEJ140HKXE2B

Noise level 50 dB (A) at HIGH
47 dB (A) at MEDIUM
42 dB (A) at LOW



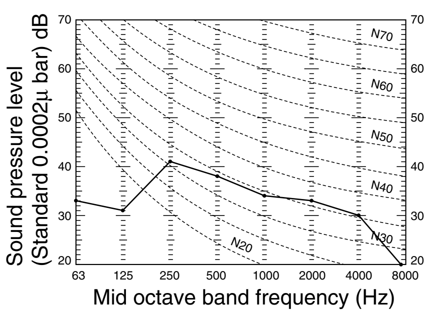
(g) Wall mounted type (FDK)

Measured based on JIS B 8616
Mike position as right



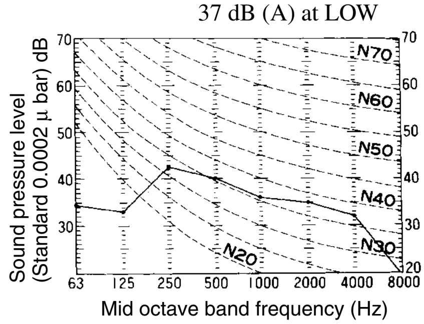
Model FDKJ22HKXE2

Noise level 40 dB (A) at HIGH
37 dB (A) at LOW



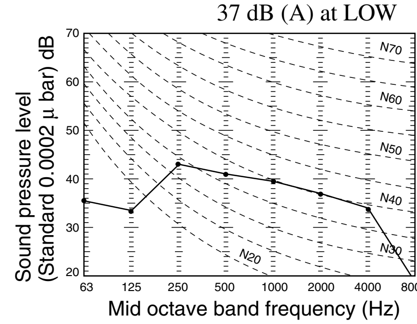
Models FDKJ28HKXE2, 36HKXE2

Noise level 42 dB (A) at HIGH
40 dB (A) at MEDIUM
37 dB (A) at LOW



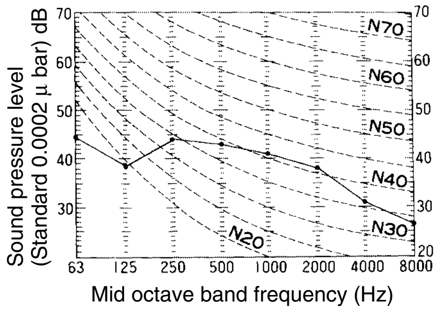
Model FDKJ45HKXE2

Noise level 44 dB (A) at HIGH
41 dB (A) at MEDIUM
37 dB (A) at LOW



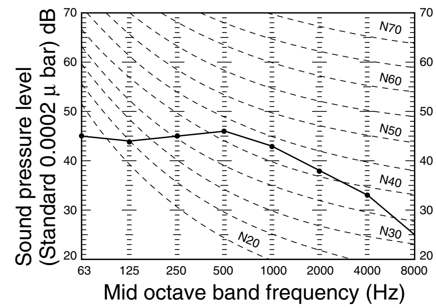
Model FDKJ56HKXE2

Noise level 46 dB (A) at HIGH
43 dB (A) at MEDIUM
39 dB (A) at LOW



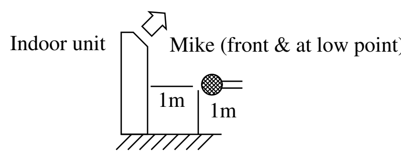
Model FDKJ71HKXE2

Noise level 47 dB (A) at HIGH
44 dB (A) at MEDIUM
40 dB (A) at LOW



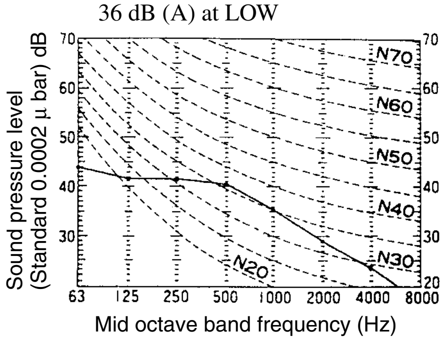
(h) Floor standing type (FDFL, FDFU)

Measured based on JIS B 8616
Mike position as right



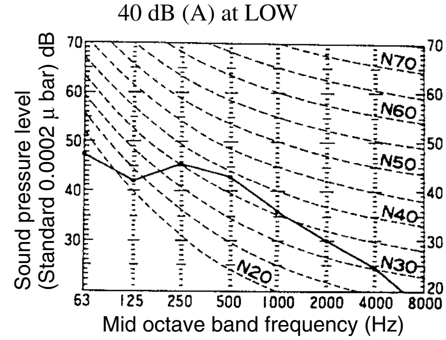
Models FDFLJ28HKXE2, FDFUJ28HKXE2

Noise level 41 dB (A) at HIGH
38 dB (A) at MEDIUM
36 dB (A) at LOW



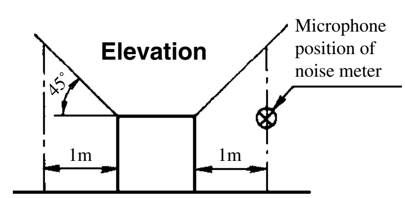
Models FDFLJ45HKXE2, 71HKXE2
FDFUJ45HKXE2, 56HKXE2, 71HKXE2

Noise level 43 dB (A) at HIGH
41 dB (A) at MEDIUM
40 dB (A) at LOW



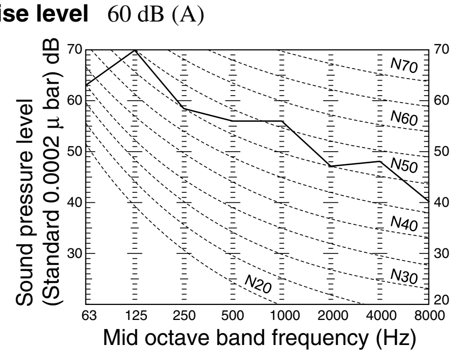
(2) Outdoor unit (FDC)

Note (1) The microphone position is as shown right.
(JIS - B8616 · Coolong)
It is the maximum noise level point which locates on the vertical face 1 m apart from unit side face.



Models FDCP224HKXRE2A, 280HKXRE2A
FDCP224HKXRE2V, 280HKXRE2V

Noise level 60 dB (A)



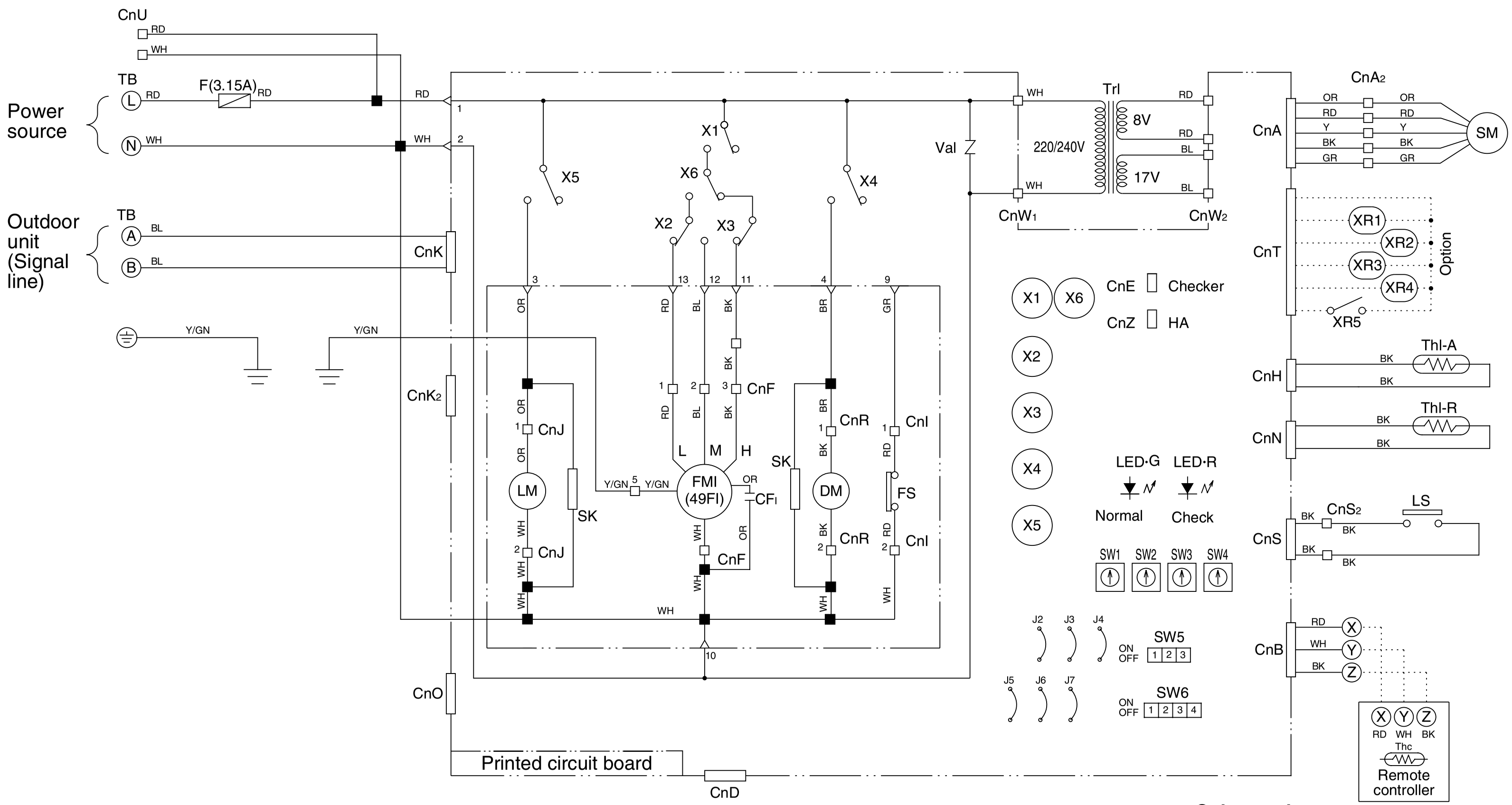
2.3 ELECTRICAL DATA

2.3.1 Electrical wiring

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models All models



Color mark

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Function of switches

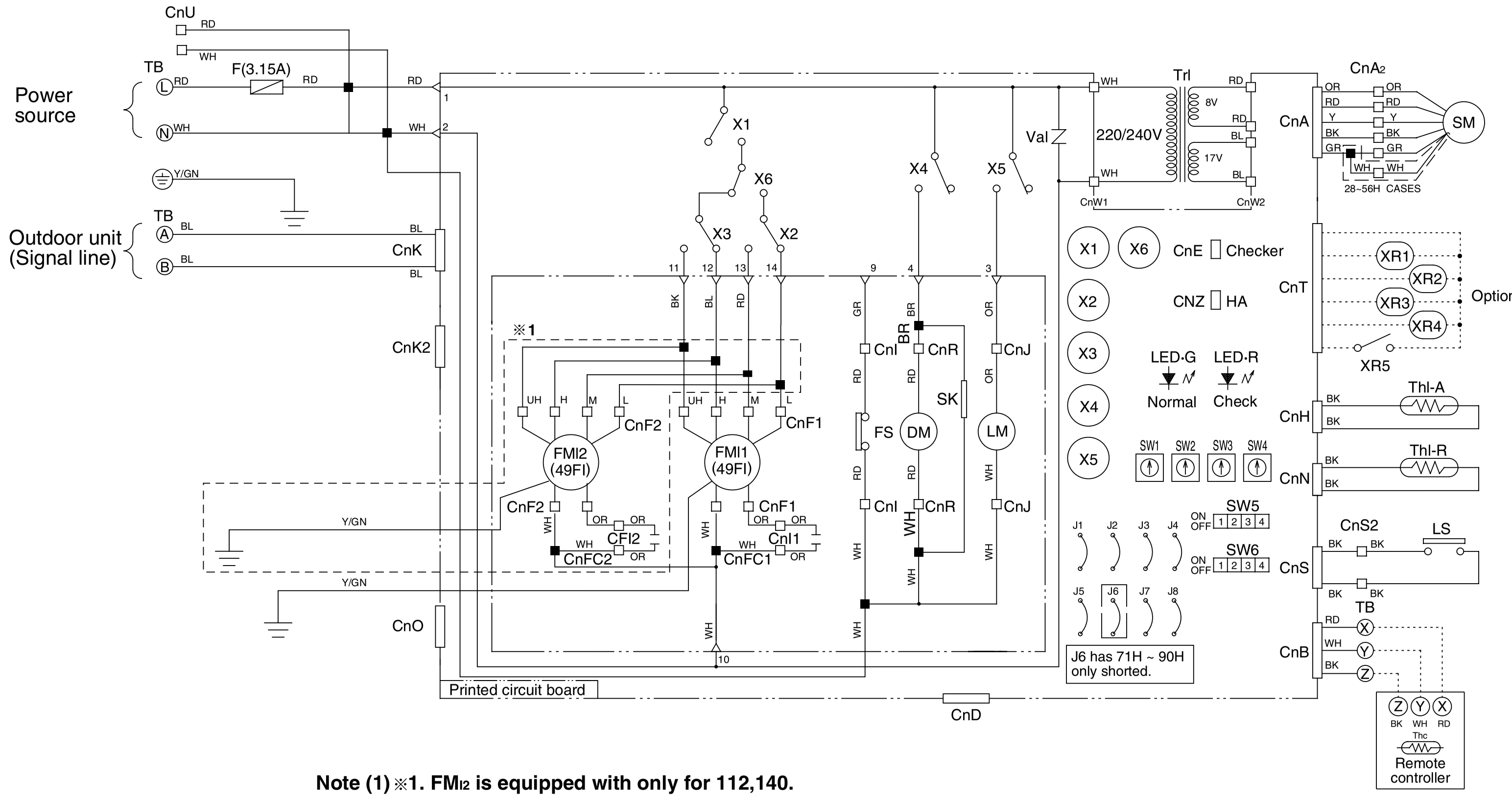
Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_I	Fan motor	Thl-A	Thermistor	CnA-Z	Connector (□ mark)
$49F_I$	Internal thermostat for FM_I	Thl-R	Thermistor	TB	Terminal block
CF_I	Capacitor for FM_I	SW1	Indoor unit address ten's place	◁mark	Terminal (F)
DM	Drain motor	SW2	Indoor unit address unit's place	■ mark	Connector
FS	Float switch (For overflow prevention)	SW3	Outdoor unit address ten's place	XR1	Operation indication (DC12)
LM	Louver motor	SW4	Outdoor unit address unit's place	XR2	Heating indication (DC12)
LS	Limit switch	SW6	Change of heat pume type	XR3	ON indication for CM (DC12)
SM	Stepping motor (For Exp.v)	Trl	Transformer	XR4	Check indication (DC12)
X1,2,3,6	Auxiliary relay (For FM_I)	Val	Varistor	XR5	Distant operation
X4	Auxiliary relay (For DM)	LED·R	Indication lamp (Red)	SK	Spark killer
X5	Auxiliary relay (For LM)	LED·G	Indication lamp (Green)		
Thc	Thermistor	F	Fuse		

(b) 2-way outlet ceiling recessed type (FDTW)

Models All models



Note (1) ※1. FMI2 is equipped with only for 112,140.

Color mark

Mark	Color	Mark	Color
BK	Black	**RD**	Red
BL	Blue	**WH**	White
BR	Brown	**Y**	Yellow
GR	Gray	**Y/GN**	Yellow/Green
OR	Orange		

Meaning of marks

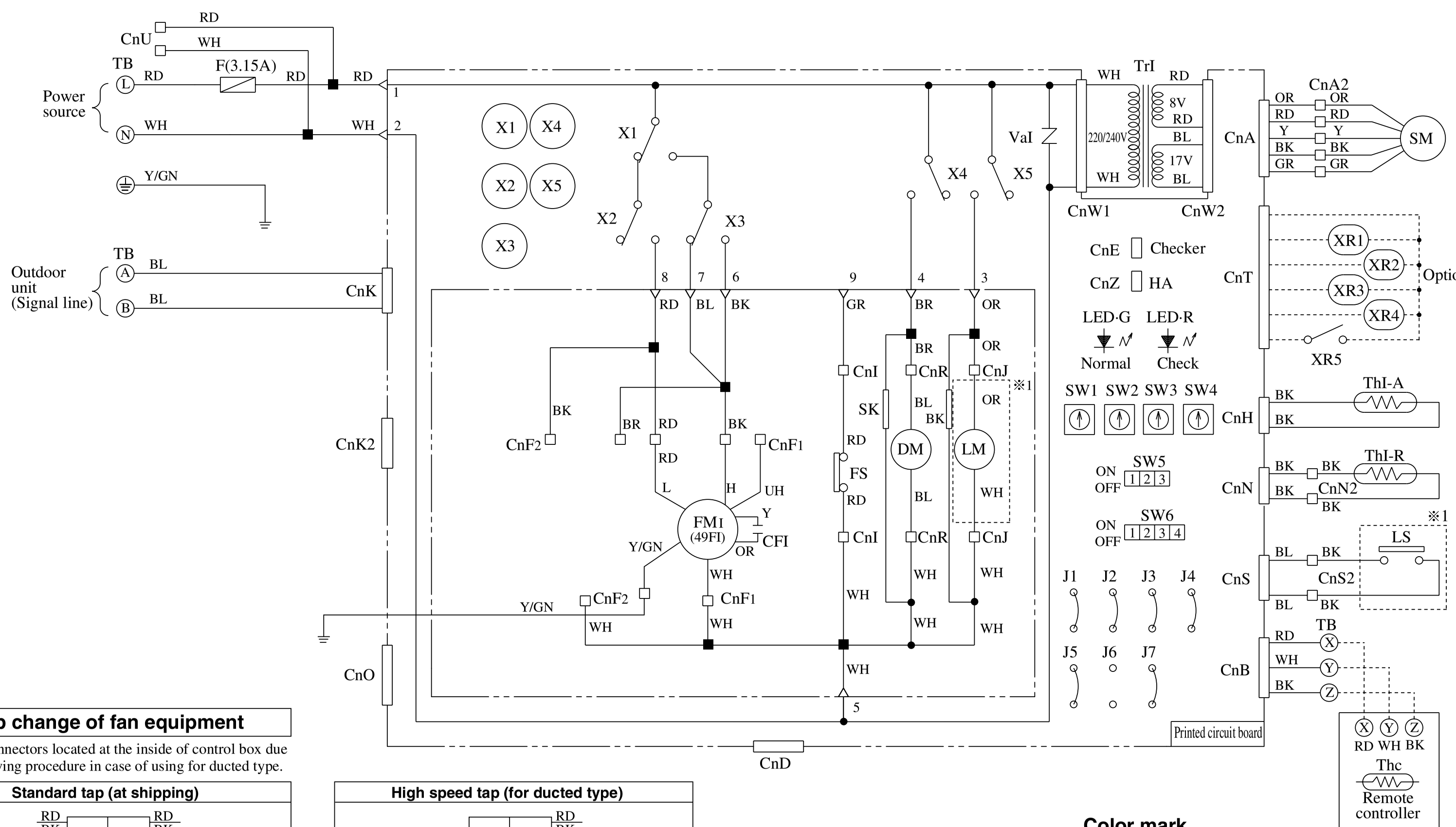
Mark	Parts name	Mark	Parts name	Mark	Parts name
FMI1,2	Fan motor	**Thl-A**	Thermistor	**CnA-Z**	Connector (□ mark)
49FI	Internal thermostat for FMI	**Thl-R**	Thermistor	**TB**	Terminal block
CFI1,2	Capacitor for FMI	**SW1**	Indoor unit address ten's place	**◀ mark**	Terminal (F)
DM	Drain motor	**SW2**	Indoor unit address unit's place	**■ mark**	Connector
FS	Float switch (For overflow prevention)	**SW3**	Outdoor unit address ten's place	**XR1**	Operation indication (DC12)
LM	Louver motor	**SW4**	Outdoor unit address unit's place	**XR2**	Heating indication (DC12)
LS	Limit switch	**SW6**	Change of heat pume type	**XR3**	ON indication for CM (DC12)
SM	Stepping motor (For Exp.v)	**Trl**	Transformer	**XR4**	Check indication (DC12)
X1,2,3,6	Auxiliary relay (For FMI)	**Val**	Varistor	**XR5**	Distant operation
X4	Auxiliary relay (For DM)	**LED·R**	Indication lamp (Red)	**SK**	Spark killer
X5	Auxiliary relay (For LM)	**LED·G**	Indication lamp (Green)		
Thc	Thermistor	**F**	Fuse		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

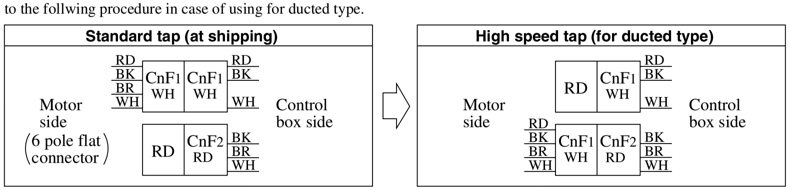
(c) Ceiling recessed single are supply port type (FDTQ)

Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3



Tap change of fan equipment

Chenge connectors located at the inside of control box due to the follwing procedure in case of using for ducted type.



Note (1) ※1.Sections marked by ※1 (LM and LS) are not equipped on the duct panel.

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM$_I$	Fan motor	ThI-A	Thermistor	CnA-Z	Connector (□ mark)
49F$_I$	Internal thermostat for FM$_I$	ThI-R	Thermistor	TB	Terminal block
CF$_I$	Capacitor for FM$_I$	SW1	Indoor unit address ten's place	◀ mark	Terminal (F)
DM	Drain motor	SW2	Indoor unit address unit's place	■ mark	Connector
FS	Float switch (For overflow prevention)	SW3	Outdoor unit address ten's place	XR1	Operation indication (DC12)
LM	Louver motor	SW4	Outdoor unit address unit's place	XR2	Heating indication (DC12)
LS	Limit switch	SW6	Change of heat pume type	XR3	ON indication for CM (DC12)
SM	Stepping motor (For Exp.v)	TrI	Transformer	XR4	Check indication (DC12)
X1,2,3	Auxiliary relay (For FM$_I$)	VaI	Varistor	XR5	Distant operation
X4	Auxiliary relay (For DM)	LED·R	Indication lamp (Red)	SK	Spark killer
X5	Auxiliary relay (For LM)	LED·G	Indication lamp (Green)		
Thc	Thermistor	F	Fuse		

Color mark

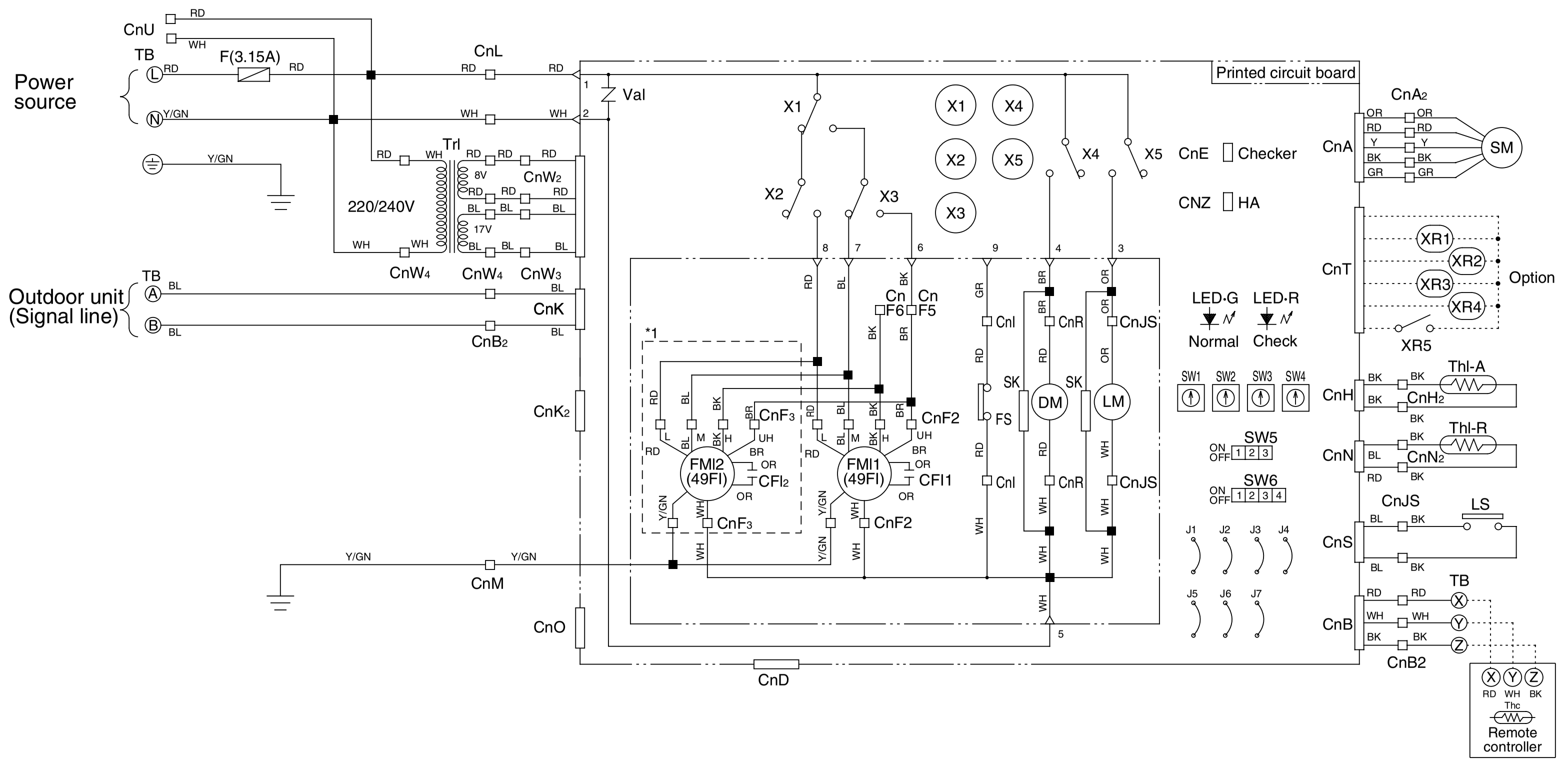
Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(d) 1-way outlet ceiling recessed type (FDTS)

Models FDTSJ45HKXE2B, 71HKXE2B



Color mark

Mark	Color	Mark	Color
BK	Black	**RD**	Red
BL	Blue	**WH**	White
BR	Brown	**Y**	Yellow
GR	Gray	**Y/GN**	Yellow/Green
OR	Orange		

Meaning of marks

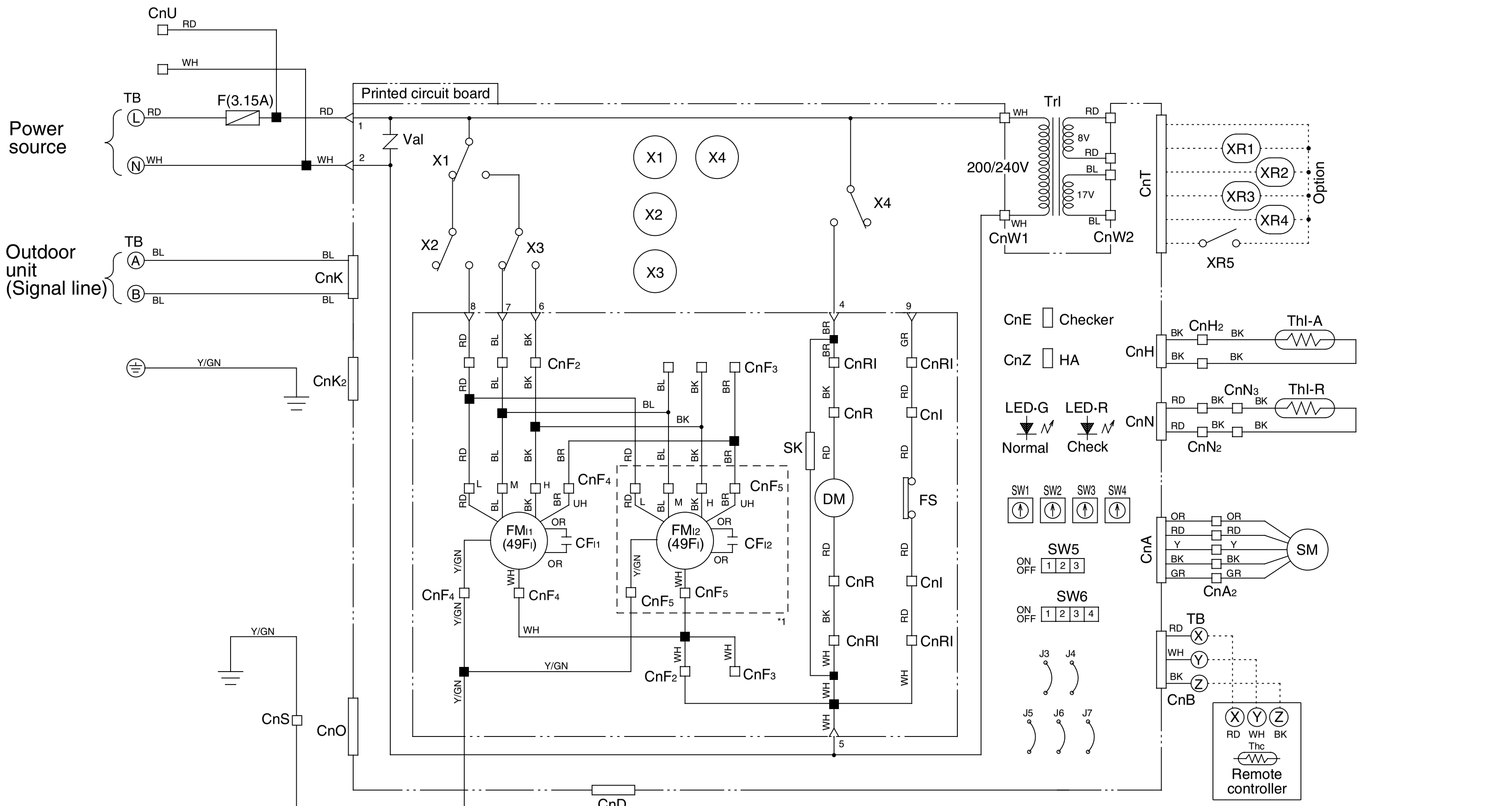
Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	**Thl-A**	Thermistor	**CnA-Z**	Connector (□ mark)
$49F_I$	Internal thermostat for FM_I	**Thl-R**	Thermistor	**TB**	Terminal block
$CF_{I1,2}$	Capacitor for FM_I	**SW1**	Indoor unit address ten's place	**◀ mark**	Terminal (F)
DM	Drain motor	**SW2**	Indoor unit address unit's place	**■ mark**	Connector
FS	Float switch (For overflow prevention)	**SW3**	Outdoor unit address ten's place	**XR1**	Operation indication (DC12)
LM	Louver motor	**SW4**	Outdoor unit address unit's place	**XR2**	Heating indication (DC12)
LS	Limit switch	**SW6**	Change of heat pume type	**XR3**	ON indication for CM (DC12)
SM	Stepping motor (For Exp.v)	**Trl**	Transformer	**XR4**	Check indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	**Val**	Varistor	**XR5**	Distant operation
X4	Auxiliary relay (For DM)	**LED·R**	Indication lamp (Red)	**SK**	Spark killer
X5	Auxiliary relay (For LM)	**LED·G**	Indication lamp (Green)		
Thc	Thermistor	**F**	Fuse		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(e) Cassetteria type (FDR)

Models All models



Note (1) *1 FM_{I2} is equipped with only for FDRJ112HKXE2,140HKXE2.

Color mark

Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Meaning of marks

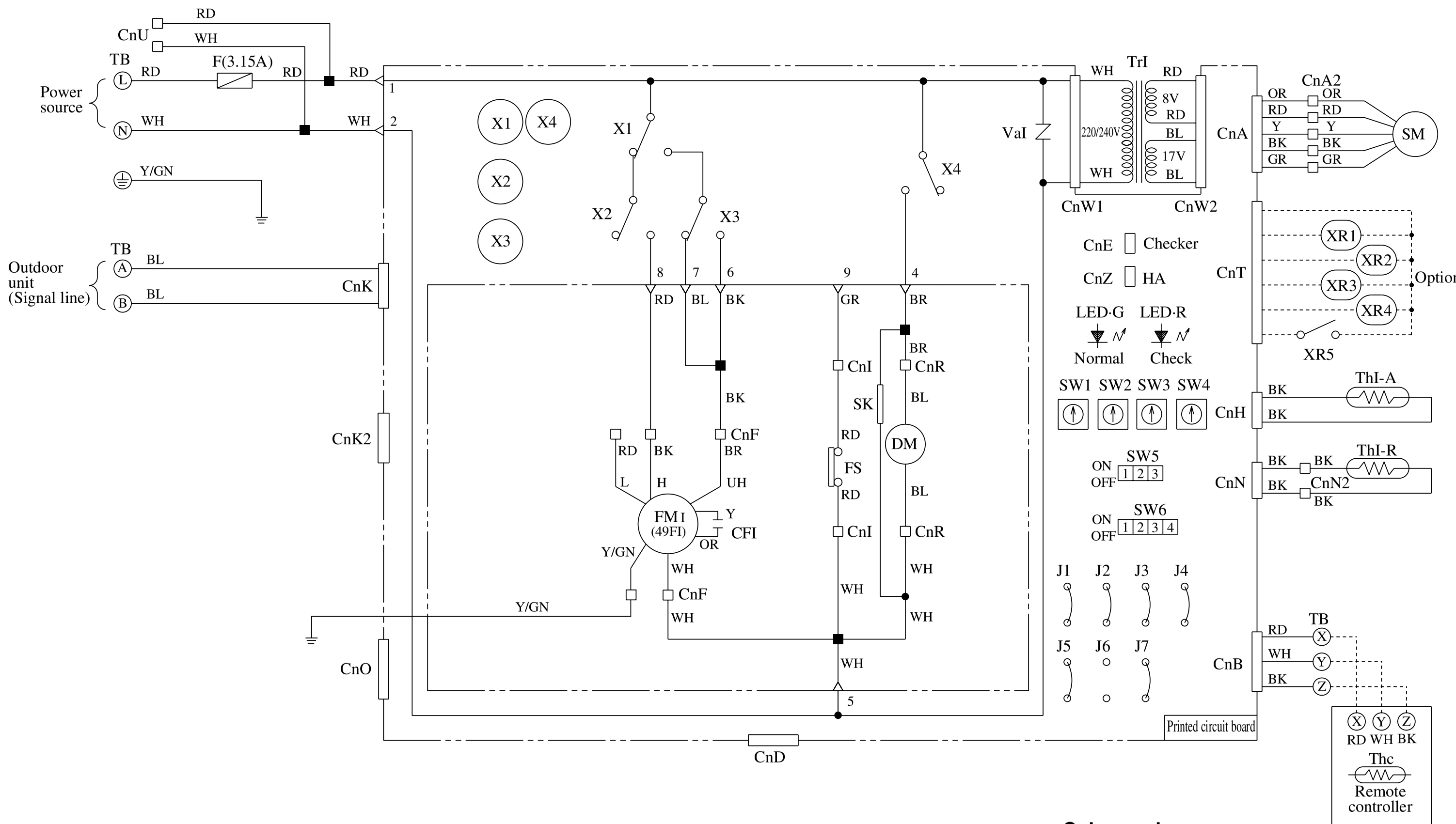
Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	Thl-R	Thermistor	CnA-Z	Connector (□ mark)
$CF_{I1,2}$	Capacitor for FM_I	SW1	Indoor unit address ten's place	TB	Terminal block
DM	Drain motor	SW2	Indoor unit address unit's place	◁mark	Terminal (F)
FS	Float switch	SW3	Outdoor unit address ten's place	■mark	Connector
SM	Stepping motor (For Exp.v)	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	SW6	Change of heat pume type	XR2	Heating indication (DC12)
X4	Auxiliary relay (For DM)	Trl	Transformer	XR3	ON indication for CM (DC12)
$49F_I$	Internal thermostat for FM_I	Val	Varistor	XR4	Check indication (DC12)
Thc	Thermistor	LED·R	Indication lamp (Red)	XR5	Distant operation
Thl-A	Thermistor	LED·G	Indication lamp (Green)	SK	Spark killer
		F	Fuse		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(f) Medium static pressure ducted type (FDQM)

Model FDQMJ36HKXE3



Color mark

Mark	Color	Mark	Color
BK	Black	**RD**	Red
BL	Blue	**WH**	White
BR	Brown	**Y**	Yellow
GR	Gray	**Y/GN**	Yellow/Green
OR	Orange		

Function of switches

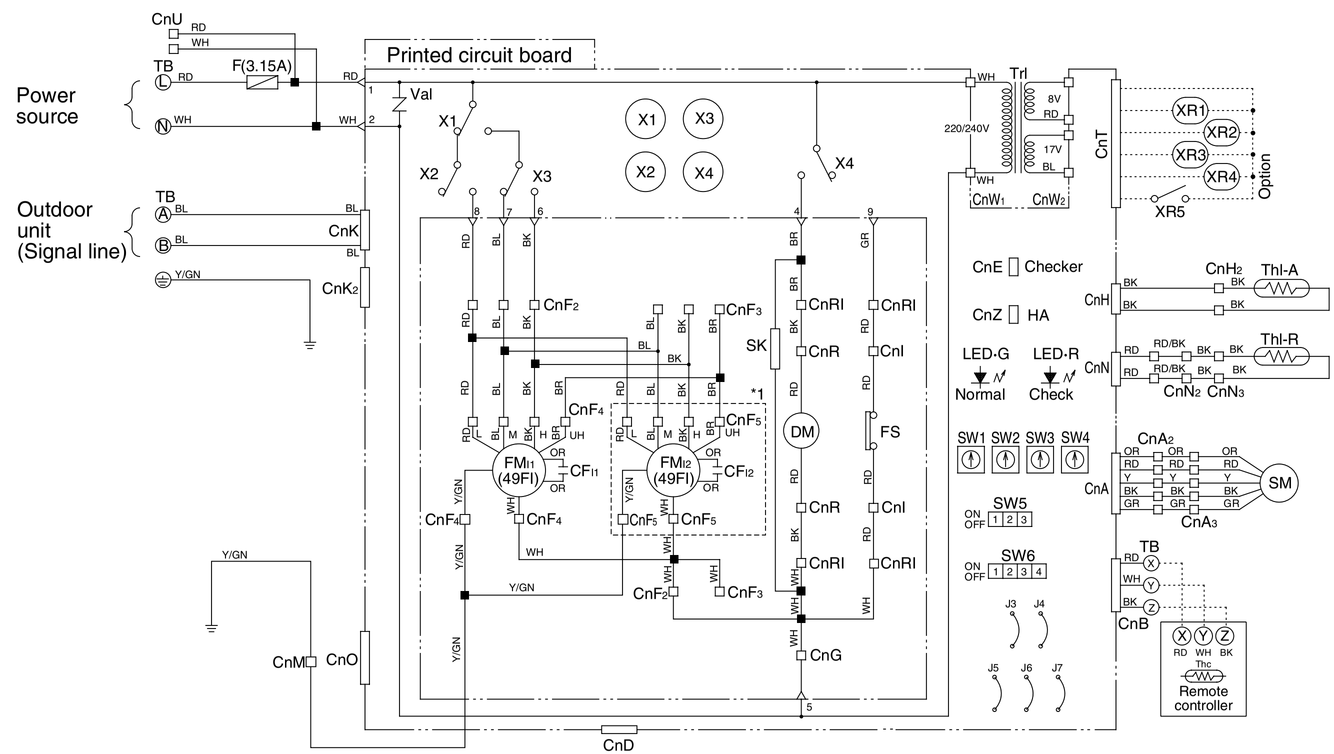
Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_I	Fan motor	**ThI-R**	Thermistor	**CnA-Z**	Connector (□ mark)
CF_I	Capacitor for FM_I	**SW1**	Indoor unit address ten's place	**TB**	Terminal block
DM	Drain motor	**SW2**	Indoor unit address unit's place	**◁mark**	Terminal (F)
FS	Float switch (For overflow prevention)	**SW3**	Outdoor unit address ten's place	**■ mark**	Connector
SM	Stepping motor (For Exp.v)	**SW4**	Outdoor unit address unit's place	**XR1**	Operation indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	**SW6**	Change of heat pume type	**XR2**	Heating indication (DC12)
X4	Auxiliary relay (For DM)	**TrI**	Transformer	**XR3**	ON indication for CM (DC12)
$49F_I$	Internal thermostat for FM_I	**VaI**	Varistor	**XR4**	Check indication (DC12)
Thc	Thermistor	**LED·R**	Indication lamp (Red)	**XR5**	Distant operation
ThI-A	Thermistor	**LED·G**	Indication lamp (Green)	**SK**	Spark killer
		F	Fuse		

(g) Satellite ducted type (FDUM)

Models All models



Note (1) *1 FM_{I2} is equipped with only for FDUMJ112HKXE2, 140HKXE2.

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	Thl-R	Thermistor	CnA-Z	Connector (□ mark)
$CF_{I1,2}$	Capacitor for FM_I	SW1	Indoor unit address ten's place	TB	Terminal block
DM	Drain motor	SW2	Indoor unit address unit's place	◁mark	Terminal (F)
FS	Float switch (For overflow prevention)	SW3	Outdoor unit address ten's place	■ mark	Connector
SM	Stepping motor (For Exp.v)	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	SW6	Change of heat pume type	XR2	Heating indication (DC12)
X4	Auxiliary relay (For DM)	Trl	Transformer	XR3	ON indication for CM (DC12)
$49F_I$	Internal thermostat for FM_I	Val	Varistor	XR4	Check indication (DC12)
Thc	Thermistor	LED·R	Indication lamp (Red)	XR5	Distant operation
Thl-A	Thermistor	LED·G	Indication lamp (Green)	SK	Spark killer
		F	Fuse		

Color mark

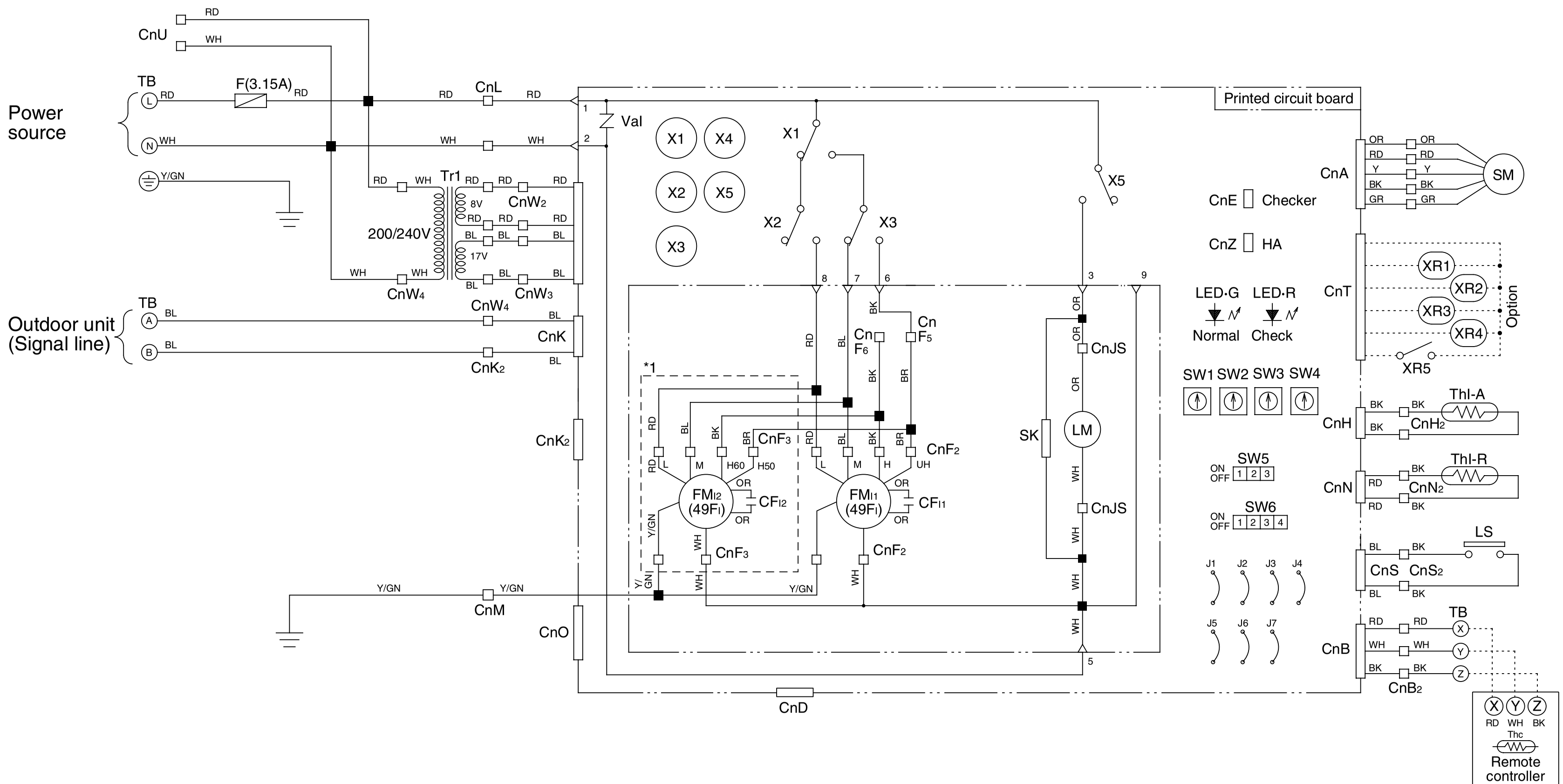
Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(h) Ceiling suspension type (FDE)

Models All models



Note(1) *1 FM_{I2} is equipped with only for FDEJ71HKXE2B,112HKXE2B,140HKXE2B.

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
$FM_{I1,2}$	Fan motor	Thl-R	Thermistor	CnA-Z	Connector (□ mark)
$CF_{I1,2}$	Capacitor for FM_I	SW1	Indoor unit address ten's place	TB	Terminal block
$49F_I$	Internal thermostat for FM_I	SW2	Indoor unit address unit's place	◁mark	Terminal (F)
LM	Louver motor	SW3	Outdoor unit address ten's place	■ mark	Connector
LS	Limit switch	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
SM	Stepping motor (For Exp.v)	SW6	Change of heat pume type	XR2	Heating indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	Trl	Transformer	XR3	ON indication for CM (DC12)
X5	Auxiliary relay (For LM)	Val	Varistor	XR4	Check indication (DC12)
Thc	Thermistor	LED·R	Indication lamp (Red)	XR5	Distant operation
Thl-A	Thermistor	LED·G	Indication lamp (Green)	SK	Spark killer
		F	Fuse		

Color mark

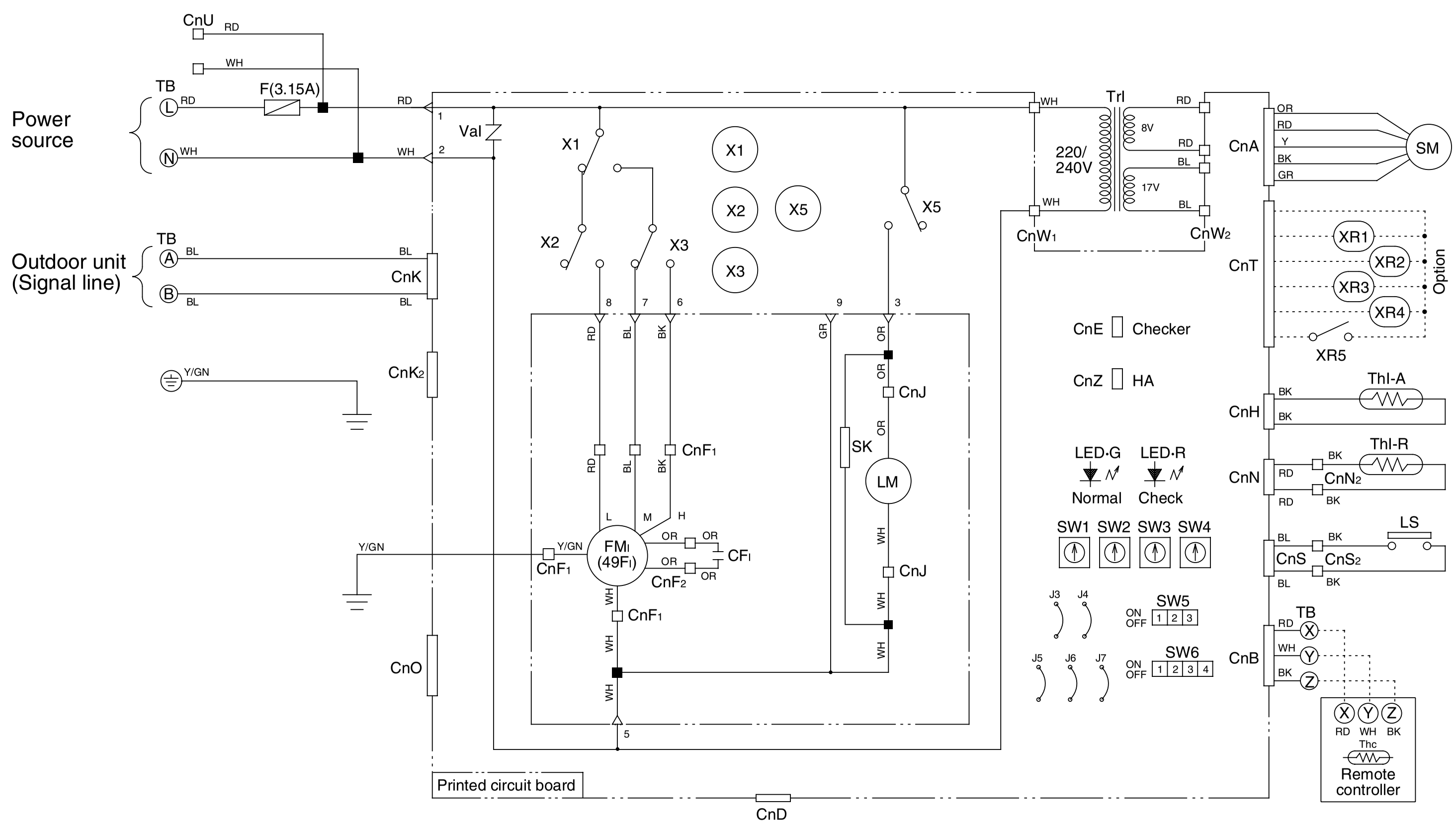
Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
BR	Brown	Y	Yellow
GR	Gray	Y/GN	Yellow/Green
OR	Orange		

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(i) Wall mounted type (FDK)

Models All models



Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_I	Fan motor	Thl-R	Thermistor	CnA-Z	Connector (□ mark)
CF_I	Capacitor for FM_I	SW1	Indoor unit address ten's place	TB	Terminal block
$49F_I$	Internal thermostat for FM_I	SW2	Indoor unit address unit's place	◁mark	Terminal (F)
LM	Louver motor	SW3	Outdoor unit address ten's place	■ mark	Connector
LS	Limit switch	SW4	Outdoor unit address unit's place	XR1	Operation indication (DC12)
SM	Stepping motor (For Exp.v)	SW6	Change of heat pume type	XR2	Heating indication (DC12)
X1,2,3	Auxiliary relay (For FM_I)	Trl	Transformer	XR3	ON indication for CM (DC12)
X5	Auxiliary relay (For LM)	Val	Varistor	XR4	Check indication (DC12)
Thc	Thermistor	LED·R	Indication lamp (Red)	XR5	Distant operation
Thl-A	Thermistor	LED·G	Indication lamp (Green)	SK	Spark killer
		F	Fuse		

Color mark

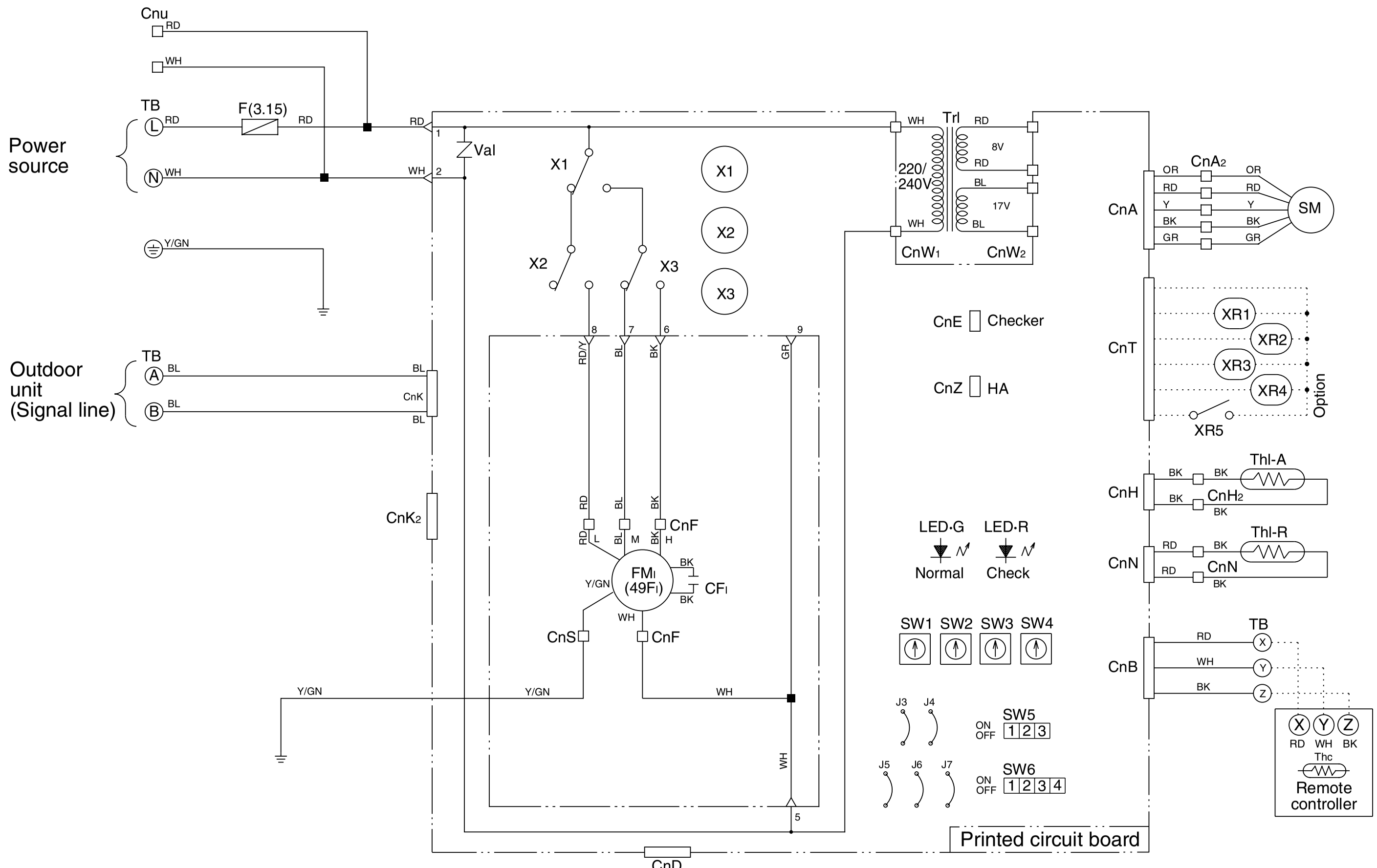
Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
GR	Gray	Y	Yellow
OR	Orange	Y/GN	Yellow/Green

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(j) Floor standing exposed type (FDFL)
(k) Floor standing hidden type (FDFU)

Models All models



Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
FM_I	Fan motor	SW2	Indoor unit address unit's place	CnA-Z	Connector (□ mark)
CF_I	Capacitor for FM_I	SW3	Outdoor unit address ten's place	TB	Terminal block
$49F_I$	Internal thermostat for FM_I	SW4	Outdoor unit address unit's place	◁mark	Terminal (F)
SM	Stepping motor (For Exp.v)	SW6	Change of heat pume type	■ mark	Connector
X1,2,3	Auxiliary relay (For FM_I)	Trl	Transformer	XR1	Operation indication (DC12)
Thc	Thermistor	Val	Varistor	XR2	Heating indication (DC12)
Thl-A	Thermistor	LED·R	Indication lamp (Red)	XR3	ON indication for CM (DC12)
Thl-R	Thermistor	LED·G	Indication lamp (Green)	XR4	Check indication (DC12)
SW1	Indoor unit address ten's place	F	Fuse	XR5	Distant operation

Color mark

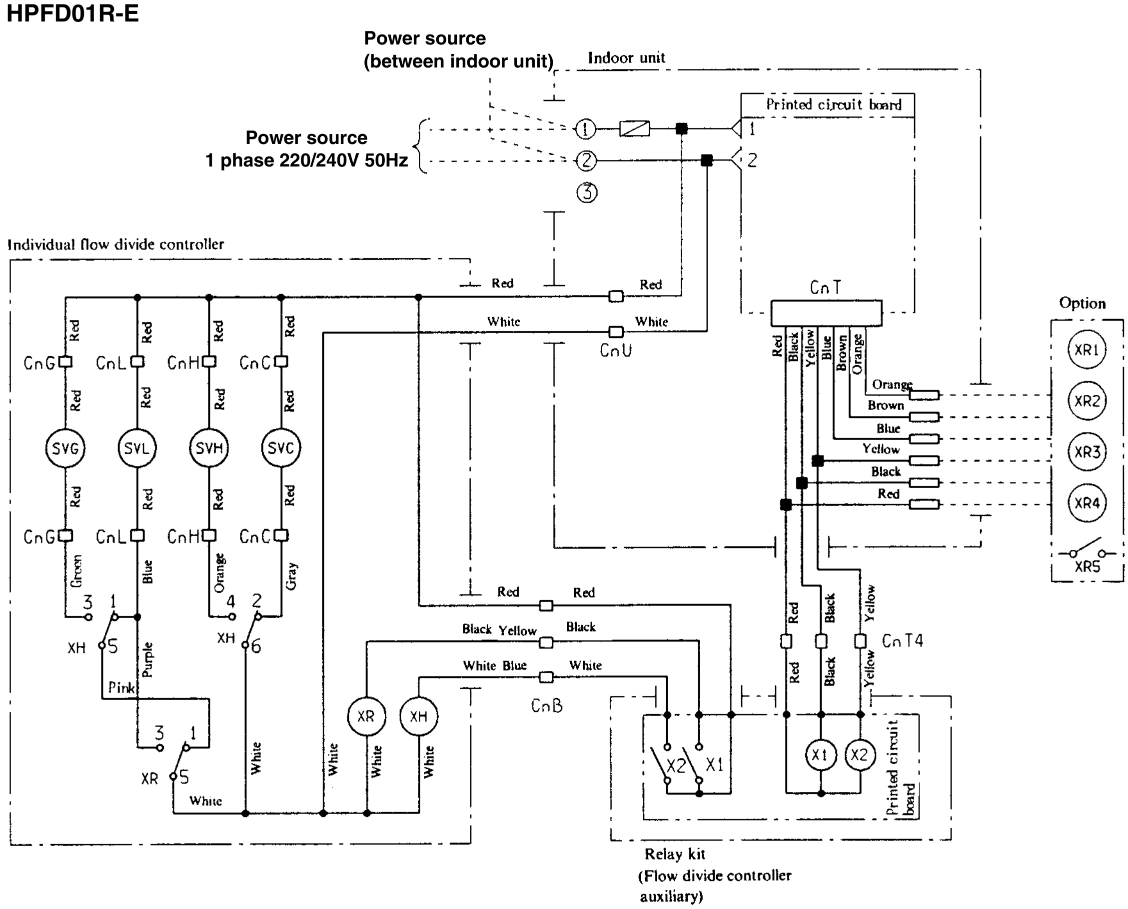
Mark	Color	Mark	Color
BK	Black	RD	Red
BL	Blue	WH	White
GR	Gray	Y	Yellow
OR	Orange	Y/GN	Yellow/Green

Function of switches

Mark	Function		
SW5-1	ON	Input signal	Reverse Invalid
	OFF		Run Stop
SW5-2	ON	Heating temp. shift + 3	
	OFF	Normal	
SW5-3	ON	Test run of condensate pump motor	
	OFF	Normal	

(2) Flow divide controller

HPFD01R-E

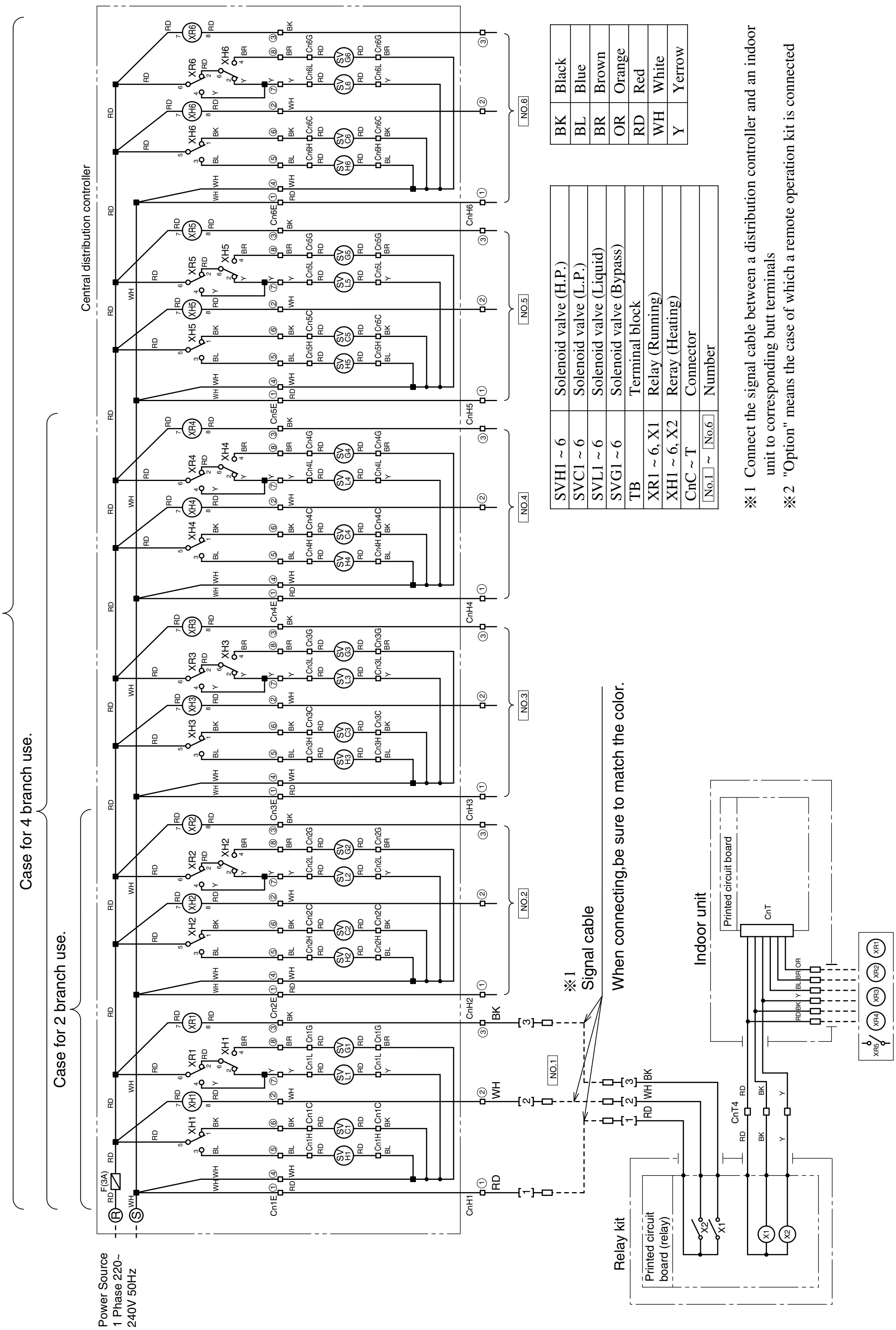


Notes (1) This illustration shows the circuit diagram for when 1 indoor unit is connected with a central flow divide controller and relay kit (flow divide controller accessory).
(2) “.......” denotes the local wiring.
(3) The option shows when a remote start/stop and monitoring kit is connected.

• Meaning of marks

SVH	High-pressure gas solenoid valve
SVC	Low-pressure gas solenoid valve
SVL	Liquid solenoid valve
SVG	Bypass solenoid valve
XR, X1, XR1	Operation output
XH, X2, XR2	Heat output
XR3	Thermal ON output
XR4	Inspection output

HPFD02R-E, 04R-E, 06R-E



SVH1 ~ 6	Solenoid valve (H.P.)
SVC1 ~ 6	Solenoid valve (L.P.)
SVL1 ~ 6	Solenoid valve (Liquid)
SVG1 ~ 6	Solenoid valve (Bypass)
TB	Terminal block
XR1 ~ 6, X1	Relay (Running)
XH1 ~ 6, X2	Reray (Heating)
CnC ~ T	Connector
No.1 ~ No.6	Number

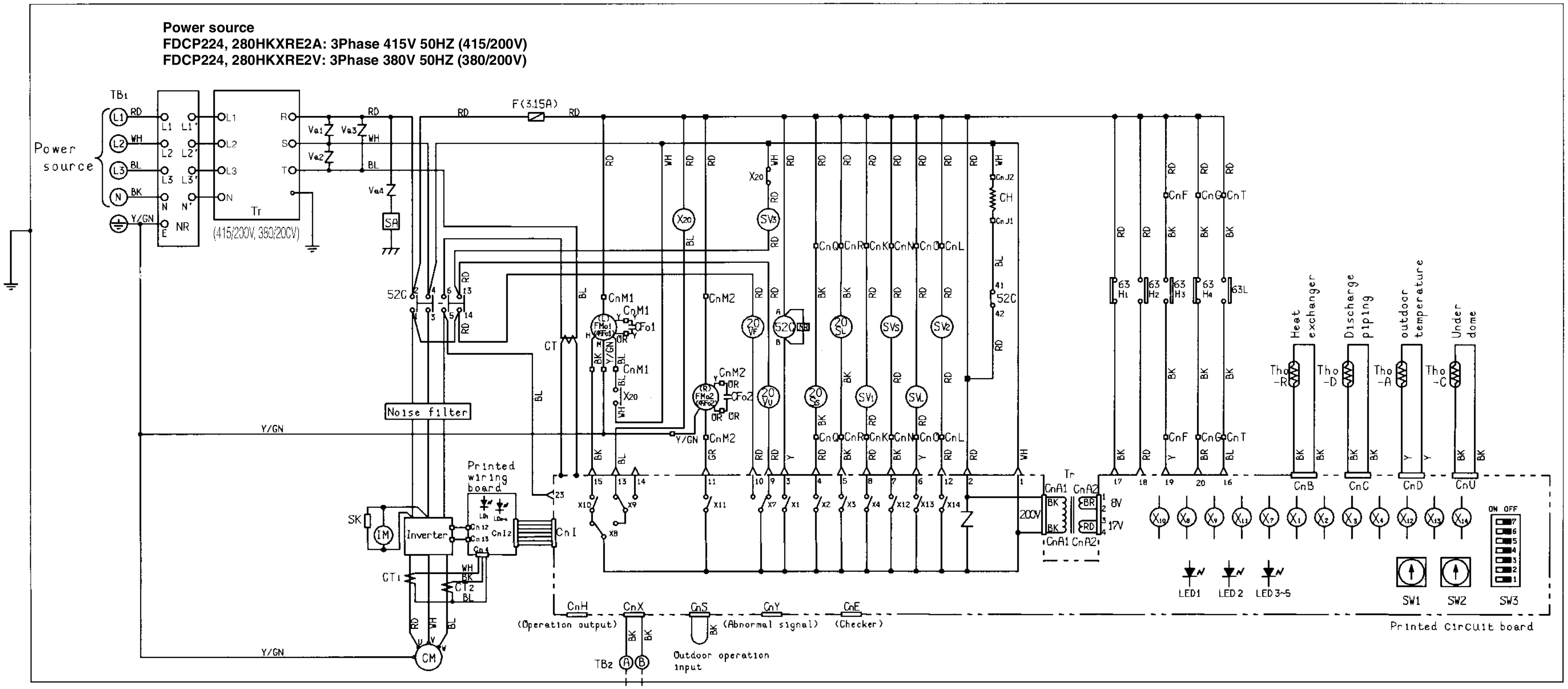
BK	Black
BL	Blue
BR	Brown
OR	Orange
RD	Red
WH	White
Y	Yerrow

※1 Connect the signal cable between a distribution controller and an indoor unit to corresponding butt terminals

※2 "Option" means the case of which a remote operation kit is connected

(3) Outdoor unit

Models FDCP224HKXRE2A, 280HKXRE2A
FDCP224HKXRE2V, 280HKXRE2V



Notes (1) "......." denotes the local wiring.
(2) Ⓐ and Ⓑ of TB_2 are the signal wire terminal blocks (5V).
(3) Use 0.75 to $2mm^2 \times 2$ core wire for the indoor and outdoor connection signal wire.
(4) The signal wiring shall be separate from the powe supply wiring.

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
CM	Compressor motor	$20S_L$	4way valve (rear heat exchanger)	SK	Spark killer
$FM_{1,2}$	Fan motor (outdoor unit)	$20V_F$	Solenoid valve (full)	SA	Arrestor
IM	Motor for cooling inverter	$20V_U$	Solenoid valve (partial)	Tr	Transformer
52C	Magnetic contactor for CM	SV_1	Solenoid valve (compressor cooling)	$Va_{1,2,3,4}$	Varistor
$49F_{1,2}$	Internal thermostat for FMo	SV_2	Solenoid valve (excessive cooling heat exchanger by-pass)	$TB_{1,2}$	Terminal block
CH	Crankcase heater	SV_3	Solenoid valve (discharge gas by-pass)	F	Fuse
$CF_{1,2}$	Capacitor for FMo	SV_S	Solenoid valve (for front heat exchanger stoppage)	$Cn_{A\sim Y}$	Connector (□mark)
X_1	Auxiliary relay (for 52C)	SV_L	SOlenoid valve (rear heat exchanger stoppage)	SW_1	Unit No.10 rank of outdoor unit
X_2	Auxiliary relay (for 20SS)	$63H_1$	High Pressure switch (for protection)	SW_2	Unit No.1 rank of outdoor unit
X_3	Auxiliary relay (for 20SL)	$63H_2$	High Pressure switch (for control)	$SW_{3\text{-}1}$	L.E.D. reset
X_4	Auxiliary relay (for SV1)	$63H_3$	High Pressure switch (high pressure control)	$SW_{3\text{-}2}$	Defrost change
X_7	Auxiliary relay (for 20VF, 20VU)	$63H_4$	High Pressure switch (high pressure control)	$SW_{3\text{-}3}$	Prevention of snow accumulation
$X_{8\sim10}$	Auxiliary relay (for FMo1)	63L	Low Pressure switch (low pressure control)	LED_1	Indication lamp (red)
X_{11}	Auxiliary relay (for FMo2)	Tho-A	Thermistor (outdoor air temp)	LED_2	Indication lamp (Green)
X_{12}	Auxiliary relay (for SVS)	Tho-C	Thermistor (dome temp)	$LED_{3\text{-}5}$	Indication lamp (Yellow)
X_{13}	Auxiliary relay (for SVL)	Tho-D	Thermistor (discharge temp)	LD_1	Indication lamp (Green)
X_{14}	Auxiliary relay (for SV2)	Tho-R	Thermistor (outdoor H.X. temp)	$LD_{2\text{-}4}$	Indication lamp (red)
X_{20}	Auxiliary relay (for SV3)	$CT_{1,2}$	Current sensor		
$20S_S$	4way valve (front heat exchanger)	NR	Noise killer		

Color mark

Mark	Color	Mark	Color
BK	Black	OR	Orange
BL	Blue	RD	Red
BR	Brown	WH	White
GN	Green	Y	Yellow
GR	Gray	Y/GN	Yellow/green

Function of switches

Mark	Function	
$SW_{3\text{-}4}$	ON	Trial operation
	OFF	Regular operation
$SW_{3\text{-}5}$	ON	Cooling trial operation
	OFF	Heating trial operation
$SW_{3\text{-}6}$	ON	Compulsory operation
	OFF	Regular operation
$SW_{3\text{-}7}$	ON	Test mode
	OFF	Regular operation

2.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

2.4.1 Remote controller (Optional parts)

FDR, FDQM, FDUM,FDFL and FDFU series are not provided with AUTO SWING switch.

Panel shown below will appear if you open the cover. All contents of display on the LCD are indicated simultaneously for the purpose of explanation.

Pull the knob on the cover to this side to open it downward.

Filter sign
When this sign is indicated, clean the filter.

Remote display
This is displayed when the unit is controlled with an individual controller during normal operation. (Also displayed when the air conditioner is stopped.)

Central display
This is displayed when the unit is controlled with the optional central console.

Timer operation display
Contents of timer operation are displayed. (Also displayed when the air conditioner is stopped.)

Setting temperature display
Displays the temperature that has been set.

Fan speed display
Displays the fan speed that has been set.

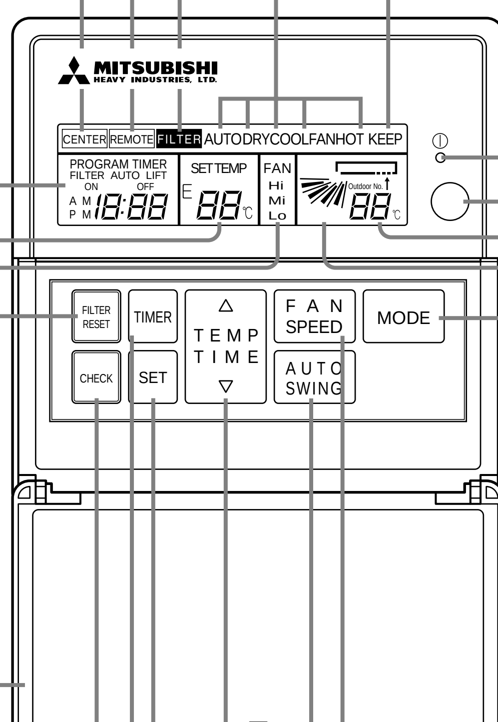
Filter reset switch
Use this switch to reset (erase) the filter sign display. (Press the switch after cleaning the air filter.)

Cover

Inspection switch
Use this switch when servicing the unit.

Timer switch
Use this switch when selecting contents of timer operation.

Set switch
Use this switch to set a time for the timer.



Operation mode display
Displays the operation mode that has been selected.

Heating preparation display

Operation/ Inspection indicator lamp
During operation: Green lamp flashes.
In case of error: Red lamp flashes.

On/Off switch
Use this switch to start or stop the air conditioner. First push on the switch starts the unit and second push stops it. (The switch can be operated without opening the cover.)

Return air temperature display
Displays the return air temperature.

Note
Indicated value may be different from actual reading on a thermometer or other instrument but this is notnecessarily an error.

Auto swing display
Indicates the swing louver condition.

Mode switch
Use this switch to select operation modes.

Fan speed switch
Use this switch to set a fan speed.

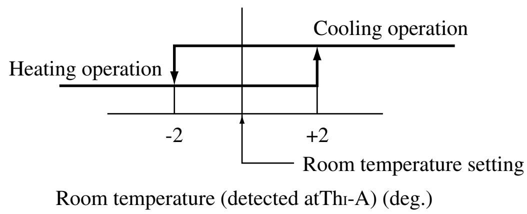
Auto swing switch
Use this switch to operate or stop the swing louver.

Temperature/ Time setting switch
Use this switch to set the room temperature or time on the timer.

2.4.2 Indoor unit

(1) Automatic operation

Once the [Auto] mode is selected by remote control, the operating mode is automatically selected according to the setting temperature and the intake air temperature of the indoor unit and cooling or heating operation is performed. The determination is performed when the thermostat has been in the OFF mode for 10 minutes or more continuously.



Notes (1) No determination is made if the mode setting is cooling, dehumidify or heating and the cooling and heating thermostats have been in the off mode for 10 minutes in the automatic operation mode.
(2) If set to automatic operation mode when the intake temperature is within ± 2 in relation to the setting temperature, the same operation as the previous automatic operation will be performed. (Note that it will be the heating mode when first turned on after the power has been turned off.)

(2) Cooling operation

(a) Cooling

1) If the sum of selected and required frequencies is not larger than the maximum frequency, the required frequencies listed in the following table apply. If the sum of required frequencies is larger than the maximum frequency, the required frequencies divided proportionally apply.

Frequency bands for indoor unit models

Model (Indoor) / Category	All series								
	22 model	28 model	36 model	45 model	56 model	71 model	90 model(1)	112 model	140 model
Required frequency (Hz)	10 ~ 15	10 ~ 20	10 ~ 25	10 ~ 25	15 ~ 30	15 ~ 40	15 ~ 50	35 ~ 60	35 ~ 70
Selected frequency (Hz)	5 ~ 15	5 ~ 20	5 ~ 25	5~ 25	5 ~ 30	5 ~ 40	5 ~ 50	5 ~ 60	5 ~ 70

Notes (1) Frequency during cooling is 45 Hz.
(2) The required frequency is counted in the unit of 5 Hz and the selected frequency in the unit of 1 Hz.

2) This indoor unit electronic expansion valve (EEV) controls opening of each indoor unit corresponding to decision frequency. Also, the thermostat is sampled in pitch of 20 second.

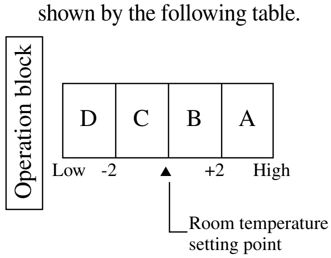
(b) Cooling thermostat off

(i) When all thermostata of indoor unit in a module are turned off, the indoor units operate in the cooling thermostat off mode per outdoor unit module.

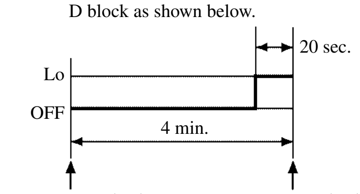
(ii) When the decision frequency to indoor units is less than 5Hz, or when the demand frequency reaches to the OFF area according to fuzzy operation, the indoor units will select the cooling thermostat of mode.

(3) Dehumidifying (Thermal dry)

- This cooling operation is mainly for dehumidifying, with which the compressor, indoor and outdoor fans are operated in the patterns as listed in the following table and in accordance with operation blocks switched with the room temperature sensor. The operation blocks are selected by checking the return air temperature at 4-minute intervals. Respective functional items are operated in each operation block as shown by the following table.



• Indoor unit fan will be operated in D block as shown below.



Item		Operation block A	B	C	D
Indoor unit frequency (Hz)	22 model	10	10	10	0
	28 model	15	10	10	0
	36 model	20	15	10	0
	45 model	20	15	10	0
	56 model	25	15	15	0
	71 model	30	20	15	0
	90 model	40	25	15	0
	112 model	50	40	35	0
	140 model	60	45	35	0
Compressor		Sum of frequencies on combined indoor units			
Indoor unit electronic expansion valve		Frequency adaptation			
Indoor unit fan		Me	Lo	Lo	Lo↔OFF
Outdoor unit fan		Operation	Operation	Operation	Stop

(4) Heating operation

(a) Heating

• This is same as the cooling operation.

(b) Heating operation with thermostat OFF

1) Intermittent fan operation control

a) When the jumper wire J3 on the indoor PCB is shorted (installed at shipping),the fan of the unit of which the thermostat is turned OFF during heating is operated in the Lo mode, and the indoor fan is turned OFF if the temperature rises 1˚C or more than the return air temperature at the thermostat OFF.

b) Indoor fan OFF condition is maintained for 5 minutes and then the operation is reset at the Lo mode again. After operating for 2 minutes in the Lo mode, return air temperature is checked and, if it is 1˚C or higher, the indoor fan is turned OFF or, if it is not higher than 1˚C, the Lo mode operation continues.

Notes (1) If the heating thermostat has been turned OFF, the temperature is indicated on the remote controller only when the indoor fan is operated in the Lo mode. When it is OFF, the room temperature at the end of Lo operation is indicated.

(2) If the operation is changed to the defrosting mode while the heating thermostat is at OFF or the thermostat is turned OFF during defrosting, the indoor fan is turned OFF.

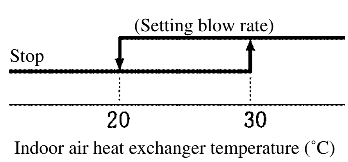
(3) Residual operation of heater is dominant over this control.

2) Fan stop control

a) If the jumper wire J3 on the indoor PCB (installed at shipment) is opened or the thermostat is turned OFF during heating operation with the remote control sensor operating, the fan on the indoor unit is turned OFF.

(c) Hot start (Prevention of cold draft during heating)

If the required frequency in the room is other than 0 Hz at the start of heating operation, the indoor fan is controlled in accordance with the temperature of indoor air heat exchanger (detected with ThI-R).



Notes (1) When the hot start (the compressor is operating and the indoor unit fan is not operating at the setting blow rate) is going on, the heating preparation is displayed (LCD on the remote controller).

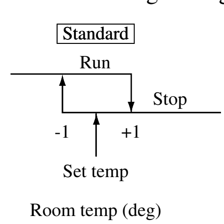
(2) When the required frequency is other than 0 Hz, once the blower should start, it will not stop even if the temperature drops below 20˚C.

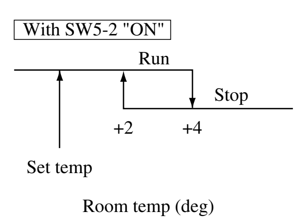
(3) After the blower has been turned OFF for 7 minutes, the blower is operated regardless of the heat exchanger temperature. (For 7 minutes after completion of defrosting during defrosting operation)

(5) Value shift adjustment of room air temperature detection in heating

Under the standard specifications, the room temperature is adjusted at the setting temperature by controlling the indoor unit capacity based on the setting temperature of thermostat and the suction air temperature.

However, where the unit is installed in the ceiling and warm air tends to stay around the ceiling, temperature in the living space may not be adjusted at the setting temperature. In such occasion, it is recommended to change the setting of dip switch SW5-2, which is found on the PCB of the indoor unit, to ON position so that the capacity control is tripped at +3 above the setting temperature of thermostat and thus the heating feeling will improve.





(6) Frost prevention during cooling

To prevent frosting during cooling operation, the temperature (detected by ThI-R) of the indoor heat exchanger is checked. If it becomes 3˚C or lower, the frequency (expansion valve opening) of the blowing unit will be decreased. If the temperature of the heat exchanger is 2˚C or lower for 2 minutes or longer, the thermostat will be turned off to switch the operation to the FAN mode. If the temperature of the heat exchanger becomes 16˚C or more after thermostat OFF operation is started, it will be returnd to the cooling mode. However, the operation will not be applied for 10 minutes after the thermostat is turned off. Moreover, the compressor will be turned off for 3 minutes if the stopped unit is continuously at the temperature of 2˚C or less for one minute. After 3 minutes, it will be returned into the normal control.

(7) Auto swing control (Excepted FDR, FDQM, FDUM, FDFL, FDFU models)

(a) Have a louver motor to move the louvers up and down for the so called “AUTO SWING” function.

(b) The louver auto swing starts when the AUTO SWING switch is pressed once and stops when the AUTO SWING switch is pressed again. The louver position is displayed on the LCD on the remote controller. During auto swing, the position displayed on the LCD changes, but the positions of the louvers and the display are not coordinated. (The louvers swing3-4 times per minute but the display changes once per second.)

(c) **Stopping the louvers**

When the AUTO SWING switch is pressed to stop the louver movement, the LCD louver-position display stops and the louvers stop when they come to the position displayed on the LCD. There are four louver stop position on the LCD. (When jumper wire J2 on the indoor unit printed circuit borad is cut, the louvers stop immediately at the AUTO SWING switch is pressed to stop them and the LCD display changes to show this posiition.

(d) **Movement of louver when the power supply to the controller controlling 4 positions of the louver is switched on.**

When power supply is switched on, the louver will automatically swing about 2 times (without operating remote controller). This is an action for the microcomputer to confirm the louver position in order to input the cycle of the luver motor (LM) to the microcomputer with the limit switch (LS) pushing the louver motor (LM). If the LS action is not input to the microcomputer, the louver will stop within 1 minute after the power supply is switched on and will not move from then on.

(e) **Keeping the louvers horizontal during heating**

While HOT KEEP is displayed (during hot start operation or when the thermostat has turned off during heating operation), the louvers stay in the horizontal position to prevent cold drafts, independent of the setting of the AUTO SWING switch (auto swing or stop). The louver position display of LCD displays continuously the original position before this control operation. When the HOT KEEP display goes out, both the louver and the LCD display return to their previous positions. (However, after the power supply to the unit is switched on, the louvers swing two times as a check of the power source frequency, regardless of the setting of the ON/OFF or AUTO SWING switches.)

(8) FILTER sign

When the operation time (time when the ON/OFF switch is turned to ON) is counted up at 600 hours [(1)], the filter sign on the remote controller flickers.

This condition can be reset any time with the “Filter reset” switch. It is effective also to turn power OFF to reset.

Note (1) The function is invalidated if the jumper wire (J4) is opened.

(9) Condensate pump motor (DM) control (Only FDT, FDTW, FDTQ, FDTS, FDR, FDQM, FDUM models)

(a) Drain motor is started no sooner than the compressor is turned ON during cooling or dehumidifying operation. The drain motor continues to operate for 2 minutes after the stop of unit operation, stop with the error stop, thermostat stop and at switching from cooling or dehumidifying operation to blowing or heating operation. When there is any unit subjected to oil return control, the drain motor is operated for 3 minutes at such occasion.

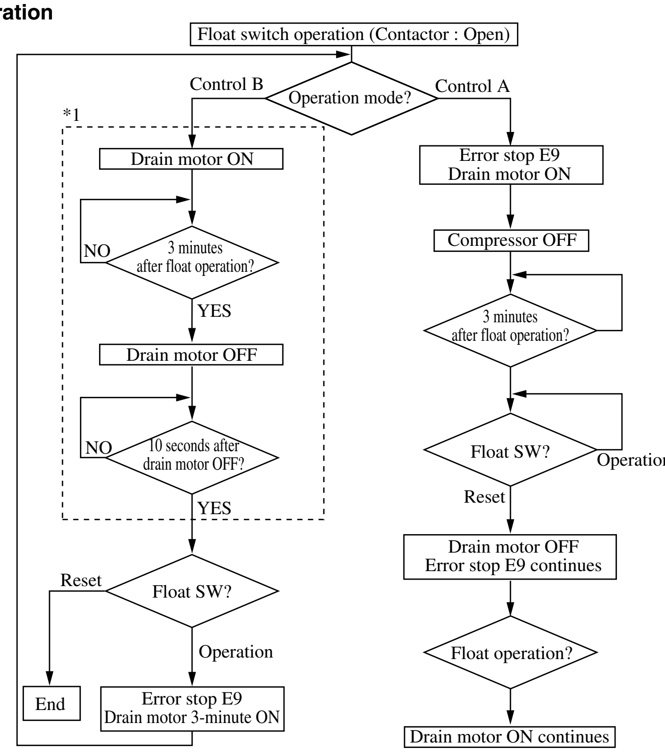
Note (1) Drain motor may be operated forcibly by turning ON the dip switch SW5-3 on the PCB. Turn the switch OFF to stop the drain motor.

(b) Overflow detection is always operable by means of the float switch regardless of operation modes. If the overflow is detected (or when the float switch is disconnected or its wire is broken), operation is stopped with the error stopped. (FDT, FDTW, FDTQ, FDTS, FDR, FDQM and FDUM) If the overflow is detected while the drain motor is stopped, the drain motor is operated for 3 minutes and then the overflow detection is performed to judge whether it is normal or not.

<table>
<tr><td rowspan="2"></td><td colspan="5">Indoor unit operation mode</td></tr>
<tr><td>OFF (1)</td><td>COOL</td><td>DRY</td><td>FAN (2)</td><td>HEAT</td></tr>
<tr><td>During compressor ON</td><td></td><td colspan="4">Control A</td></tr>
<tr><td>During compressor OFF</td><td colspan="4">Control B</td><td></td></tr>
</table>

Notes (1) Including OFF and error stop during COOL, DRY, FAN and HEAT.
(2) Including “FAN” operation due to unmatch of operation mode.

• **Flow chart of drain motor operation**



* 1 In the flow in the frame of broken line, operations of operation mode change and thermostat reset are effective and operated immediately upon selection. However, the compressor ON command is not transmitted.

(i) Control A

a) If the float switch detects the draining, operation is stopped with the error stop (E9 is displayed) and operate the drain pump.

b) Float switch is checked 3 minutes later on the unit stopped by the error and, if the error persists still, the drain motor is left at ON but, if the error has already been reset, the drain motor is turned OFF. E9 is displayed till the error is reset.

(ii) Control B

a) If the float switch detects the draining, the expansion valve is closed, the drain motor is turned ON for 3 minutes and, as 10 seconds elapses after the drain motor OFF, the float switch is checked. If the result is normal, the operation stops in the normal way while, if it is not normal, E9 is displayed, the drain motor is turned ON and the operation stops with the error stop with the expansion valve being closed completely. (It is left at ON while the draining is detected.)

(10) Multiple units control-simultaneous control of 16 unit with one remote controller

(a) Function

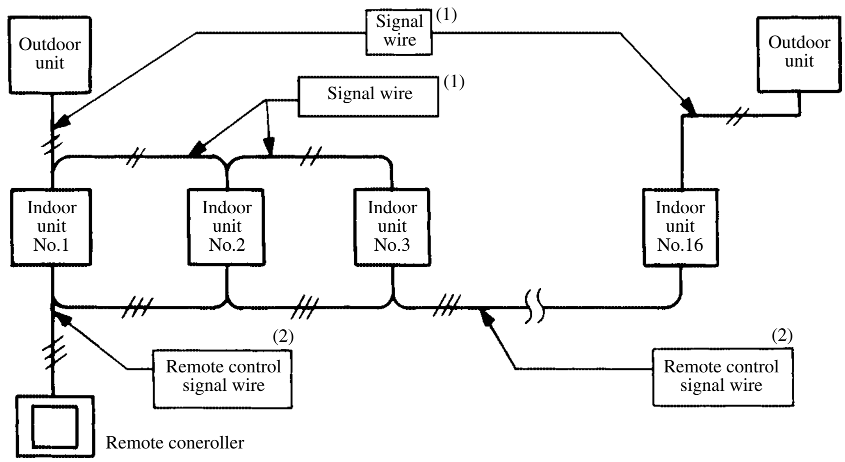
Multiple units (even of outdoor different systems, 16 units maximum) can be simultaneously controlled by using a remote controller. The remote controller is used to set the “operation mode”, and all the unit can be operated and stopped. Thermostat and protective functions of each unit functions independently.

Note(1) When part of the group gets out of order (the protective device operates), the relevant unit comes to an abnormal stop, but other normal units keep operating.

(b) Wiring Procedures

(i) Lay power cable of each unit and signal wire as usual. (Remove the remote control switches from all units excluding only one unit.) Lay wiring for the remote controller separately from power cable and wires for all other electrical equipment.

(ii)Arrange the terminal block (X, Y, Z) of the remote controller as shown below for the simultaneous control, and lay cross over in each indoor unit.



Notes (1) The overall length of the signal wire shall be less than 1000m.
(2) The length of remote control signal wire and crossover for remote controller between room shall be less than 600m.

(11) External control (remote display)/control of input signal

(a) External control (remote display) output

Following output connectors (CNT) are provided on the control circuit board of indoor unit.

(i) Operation output: Power to engage DC 12V relay (provided by the customer) is outputted during operation.

(ii) Heating output: Power to engage DC 12V relay (provided by the customer) is outputted during the heating operation.

(iii) Compressor ON output: Power to engage DC 12V relay (provided by the customer) is outputted while the compressor is operating.

(iv) Error output: When any error occurs, the power to engage DC 12V relay (provided by the customer) is outputted.

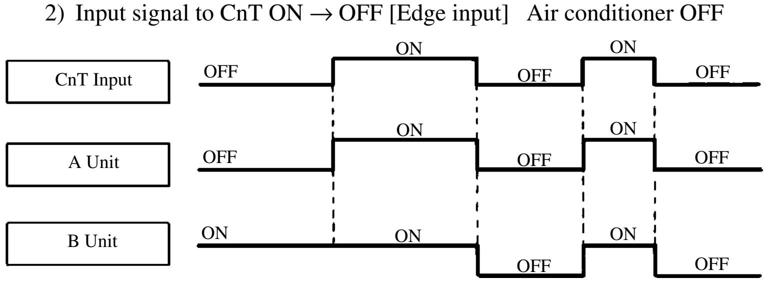
(b) Control of input signal

(Make sure to connect the standard remote control unit. Control of input signal is not available without the standard remote control unit.) Control of input signal (switch input, timer input) connectors (CNT) are provided on the control circuit board of the indoor unit. However, when the operation of air conditioner is under the Center Mode, the remote control by CnT is invalid.

(i) At shipping from factory (SW5-1 on PCB OFF)

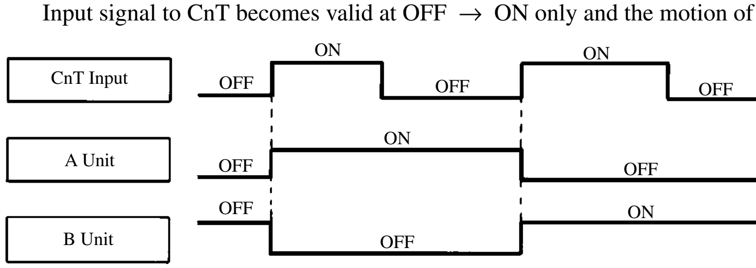
1) Input signal to CnT OFF → ON [Edge input] Air conditioner ON

2) Input signal to CnT ON → OFF [Edge input] Air conditioner OFF



(ii) When SW5-1 on the PCB of indoor unit is turned on at the field.

Input signal to CnT becomes valid at OFF → ON only and the motion of air conditioner [ON/OFF] is inverted.



2.4.3 Outdoor unit

(1) Operations of major functional items under each operation mode

Functional item \ Operation mode	Cooling		fan	Heating			Dehumidify
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Defrost	
Indoor unit fan	Remote controller command	Remote controller command	Remote controller command	Remote controller command	Intermittent[3] operation	○ → ×	○ / ×
Indoor unit electronic expansion valve	According to determined frequency	Fully closed	Fully closed	According to determined frequency	Fully closed	Fully open	According to determined frequency
Compressor	○	×	×	○	×	○	○ / ×
Outdoor unit fan	○	×	×	○	×	○ → ×	○ / ×
Drain motor	○	○	×	×	×	×	○
Solenoid valve (20VU)	○ / ×	○	○	○ / ×	○	×	○ / ×
Solenoid valve (20 VF)	× / ○	×	×	× / ○	×	○	× / ○
4way valve (20SL,SS)	Individual definitions						
Solenoid valve (SV1, L,S)	Individual definitions						

Notes (1) ○ : ON, × : OFF, ○ / × : ON or OFF

(2) Cooling and heating also include auto mode.

(3) Off if jumper wire (J3) is short circulated (factory setting) and open.

(2) Decision of frequency

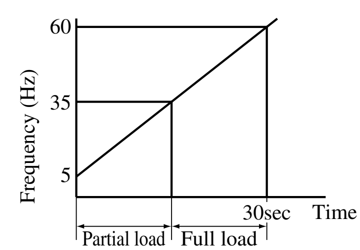
(a) The decision frequency of indoor unit is equal to the required frequency shown in the table below when the total value of required frequencies is less than the maximum frequency.
When the total value of required frequencies is more than the maximum frequency, the decision frequency is equal to the frequency where required frequencies are proportionally distributed.

Model	Total operation frequency of compressors (Hz)	Operation frequency (Hz)
		Inverter (CM1)
FDCP224HKXRE2A (V) FDCP280HKXRE2A (V)	35 ~ 95	35 ~ 95

(b) The compressor operation frequency at simultaneous operation of cooling and heating is decided to the one where the total value of required frequencies is larger, and the frequencies are proportionally distributed to each of [indoor unit in cooling/dehumidification mode] and [indoor unit in heating mode].

(3) Switchover compensation of 4-way valve

The compressor is operated with partial load at 5 to 35 Hz irrespective of decision frequency for 30 seconds after starting, and then the frequency is increased to 60 Hz with full load.

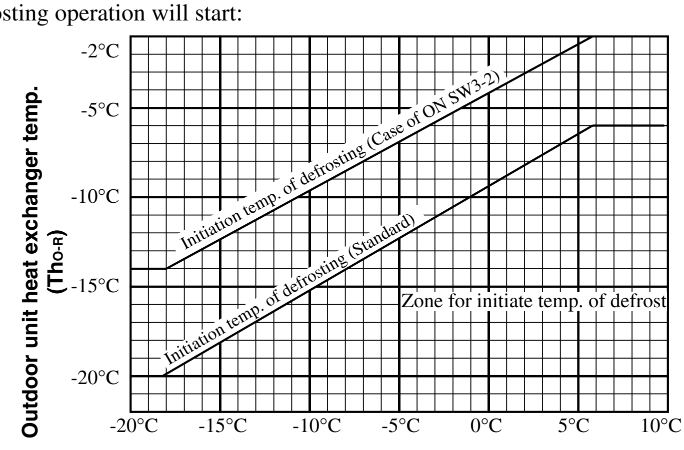


(4) Defrosting

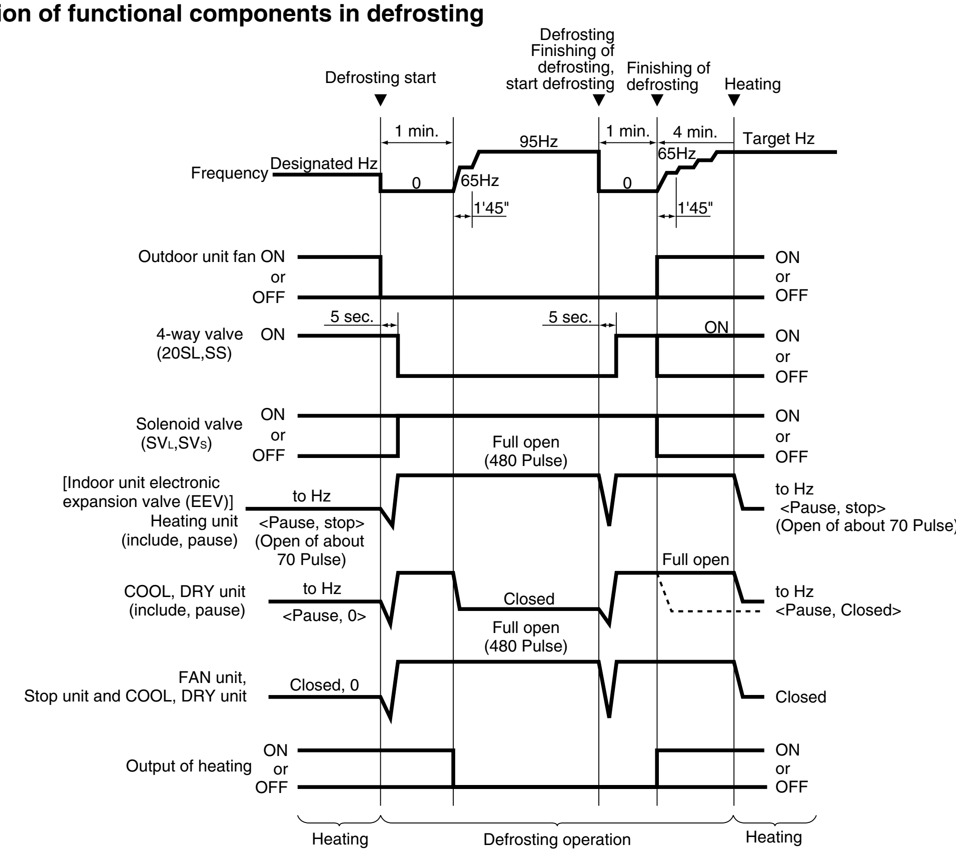
(a) Conditions for starting defrosting

When all the following conditions are met, the defrosting operation will start:

1) The cumulative operating time of the compressor comes up to 45 minutes after completion of a defrosting operation, or it comes up to 30 minutes after a heating operation starts (the remote controller is turned on).
2) Five minutes has passed after the compressor was turned off and on.
3) Five minutes has passed after end of outdoor unit fan motor control.
4) After all the above conditions have been met, the temperature of the heat exchanger thermistor (Tho-R) has been below the defrosting start temperature for three minutes in succession.



(b) Operation of functional components in defrosting



(c) Conditions for finishing defrosting

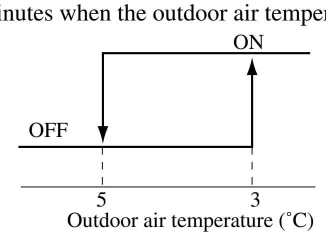
When any of the following conditions is met, the defrosting finishing operation will start.

1) When the temperature of the heat exchanger thermistor (ThO-R) increases adove 20°C

2) When 12 minutes has passed after start of defrosting.

(5) Snow fan control

Set the dip switch SW3-3 on the outdoor unit control circuit board to ON, and the outdoor fan of a standing unit is operated at the Hi speed for 10 seconds every 10 minutes when the outdoor air temperature drops below 3°C.

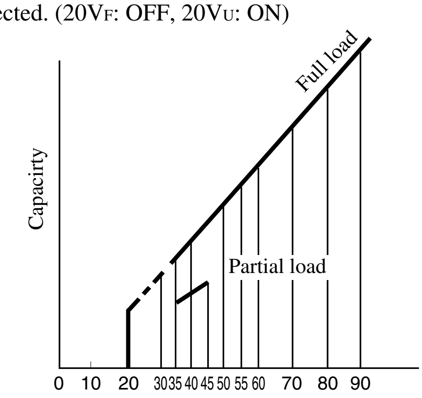


(6) Control of compressor capacity

When the load is set as low as less than 35Hz of full load operation frequency (1) to expand the capacity control range in the low load area, a Partial load (2) (full load conversion frequency:23Hz to 35Hz) is selected. (20VF: OFF, 20VU: ON)

Also, when the full load conversion frequency comes to over 35Hz during a Partial load operation, a full load operation is selected.

The compressor starts with a Partial load all the time and, after 15 seconds, selects the load and the frequency according to the demand(decision) frequency.



Notes (1) Full load operation frequency:
35Hz~95Hz(every 5Hz)
(2) Partial load operation frequency:
35Hz~45Hz(every 5Hz)
(3) The change-over occurs when 5 minutes of more operation time has passed.

(7) High pressure control

The high pressure control consists of the HP protection, HP-A control, HP-B control and LP control and the order of priority among them is assigned as HP protection >HP-A > LP > HP-B down > HP-B up.

(a) HP protection

Pressure switch (63H1: 3.24 open/2.65 close MPa) is actuated twice within 45 minutes, the operation is stopped due to the error and the check and indication (Remote controller: E40, indoor LED-green; repeated flickers, red: dark, outdoor LED-green; reperted flickers, red; 3 flickers) are performed. In case of initial operation, however, the compressor is stopped and after a delay of 3 minutes it returns to the normal operation.

(b) HP-A control

- If the pressure switch ($63H_2$) is actuated, the outdoor blower is opreated in the Hi mode (for the operations of patterns A1 to C1) or stopped (for the operations of patterns C2 to E2) and, if it is still actuated 2 minutes after a drop of 10 Hz in the inverter frequency, the frequency is dropped futher by 10 Hz. (Minimum frequency is specified at the partial load of 35 Hz.)
- Operation returns to the normal mode after operating with the frequency control at off[(1)] 6 minutes after the $63H_2$ having been reset.

Note (1) If the high pressure A control is released,the frequency is raised by 5 Hz and retained at the level for 3 minutes. The frequency is then raised by 5 Hz at 3-minute intervals till it returns to the normal operation.

(c) LP,HP-B controls

Under these controls, the high and low level pressures are controlled with the solenoid valves, outdoor fan and other so as to operate the outdoor unit in the optimum condition in accordance with changing load on the indoor unit.
Operation patterns consist of the following 12 types and respective functional parts are controlled per each pattern.

Table of operation patterns and operations of functional parts

Operation pattern	Four-way valve		Solenoid Valve				Fan motor	
	20SS	20SL	SVS	SVL	SV2	SV3	FM01	FM02
A1	×	×	○	○	×	○	HI	HI
A2	×	×	○	○	×	○	HI	×
B1	×	○	○	×	×	○	HI	HI
B2	×	○	○	×	×	○	HI	×
B3	×	○	○	×	×	×	Me	×
C1	○	○	×	×	○	○	HI	HI
C2	○	○	×	×	×	×	Me	×
D1	○	○	○	×	×	×	Me	×
D2	○	○	○	×	×	○	HI	×
D3	○	○	○	×	×	○	HI	HI
E1	○	○	○	○	×	○	HI	×
E2	○	○	○	○	×	○	HI	HI

Notes (1) ○ and × mean ON and OFF respectively.
(2) When the fan motor FM01 is in the Me mode, the solenoid valve SV3 is interlocked via a relay. (SV3 open)

1) LP control

If the pressure switch (63L: 1.96 close/2.75 open MPa) is actuated, the operation pattern is changed by one step in the direction of A1 to E2 so as to raise the low level pressure by controlling the heat exchanger capacity.

2) HP-B down control

If the pressure switch ($63H_3$: 2.11 close/2.50 open MPa) is actuated, it enters the HP-B down control and the operation pattern is changed by one step in the direction of E2 to A1 so as to lower the high level pressure by controlling the heat exchanger capacity.

3) HP-B up control

If the pressure switch ($63H_4$: 1.86 close/1.67 open MPa) is actuated, it enters the HP-B up control and the operation pattern is changed by one step in the direction of A1 to E2 so as to raise the high level pressure by controlling the heat exchanger capacity.

4) Setting the initial operation pattern

When the compressor is started, the operation starts wish one of the following operation patterns in accordance with the indoor load.

Indoor load	Initial operation pattern
Cooling only	A1
Cooling > Heating	A1
Cooling ≒ Heating	B1
Heating > Cooling	C2
Heating only	D1

5) Timing to change operation pattern

Operation pattern is changed by one step at the actuation of the pressure switch (63L, $63H_3$ or $63H_4$). Once the operation pattern is changed, the same operation pattern is maintained for 2 minutes.

However, when the frequency which was requested from the indoor side has changed 20 Hz or more, the operation pattern is changed by one step at the actuation of the pressure swich even if it is within 2 minutes.

6) Changing of operation pattern after a larger change of load

When the indoor load has changed largely like a case when scales of heating/cooling loads have been inverted, for example, the operation pattern is changed as follows.

	Operation pattern
Change from heating large to cooling large	To A1
Change from cooling large to heating large	To D3

(8) Solenoid valve for compressor cooling

The solenoid valve (SV1) for compressor cooling is kept OFF at all modes irrespective of operation/stop of the compressor except ON control.

Note (1) ○: Open, ×: Close

○ / × : Open or close depending on the temperature condition

• Control list

Control status	SV1
Normal	×
Temperature control of under dome	○ / ×
Temperature control of discharge pipe	○ / ×

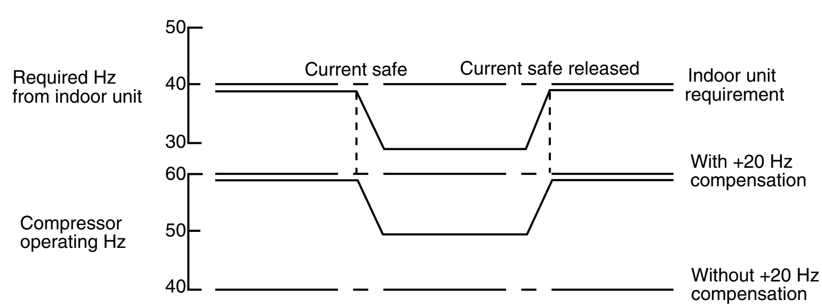
(9) Compressor operating frequency increase control

(a) In the case that at least one indoor unit requires the maximum frequency supply during cooling or heating operation for 6 minutes continuously, the compressor operating frequency is increased by 10 Hz. After that, the maximum frequency is increased by 10 Hz every continuous 6 minutes; however, the upper limit is 30 Hz.

(b) When requirement of the maximum frequency ceases, the control is released.

(c) When the protective function of frequency suppressing is activated during control, the protective motion is performed at the condition of increased frequency as the base.

(Example: When the current safe is activated at the condition of +20 Hz compensation)



(10) Control at heating change over

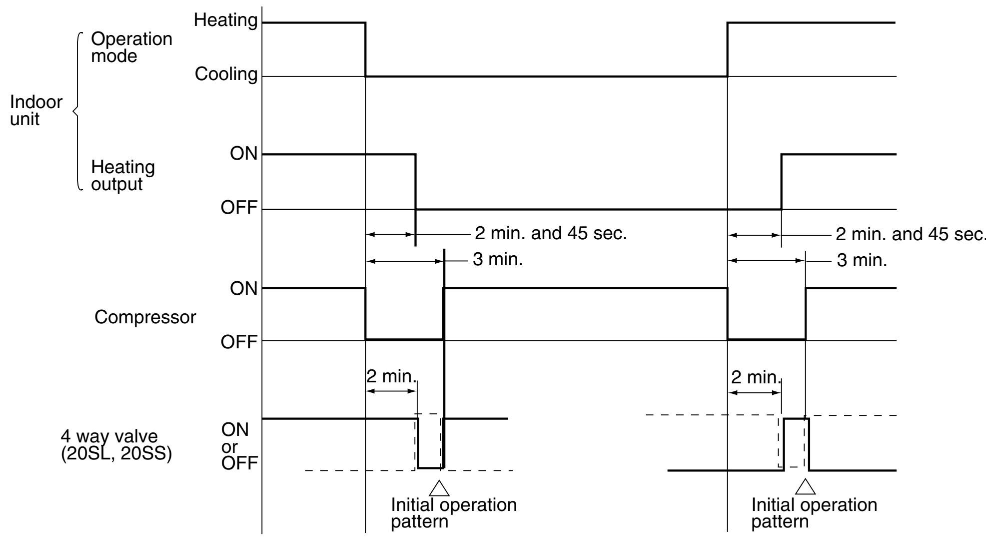
When one of the indoor units is changed over from "Cooling (including automatic), dehumidification and fan mode" to "Heating (including automatic) mode", or from "Heating mode" to "Cooling, dehumidification and fan mode", the following control is performed.

(a) During compressor is operating

1) The heating output is kept at the output condition just before cooling/heating change over for 2 minutes and 45 seconds, after that the heating output of indoor unit where cooling/heating has been changed is changed over.

2) The 4 way valve (20SL, 20SS) is changed over at 2 minutes after the compressor stopped.

3) The compressor starts operation with the operation pattern shown in the following diagram after 3 minutes' stop.



(b) When the compressor has kept on stopping for 2 minutes and 45 seconds or more:

1) The heating output is changed over immediately.

2) The motion of compressor and 4 way valve is the same manner as described in Article (a).

(c) When the stop time of compressor is less than 2 minutes and 45 seconds:

1) The heating output is changed over after 2 minutes and 45 seconds has passed since the compressor stop.

2) The motion of compressor and 4 way valve is the same manner as described in Article (a).

(11) Devices related to unit protection and maintenance

(a) Test run mode

The test run mode can be set from the outside by using the switch SW3-4,5 on the outdoor unit control circuit board

(i) Switch function

Switch		Function
SW3-4	ON	• To operate all connected indoor units. • Indoor units demands the maximum frequency and outdoor units are operated with the maximum frequency according to request from the indoor unit.
	OFF	• Normal operation
SW3-5	ON	• When SW3-4 is set to ON: Cooling operation
	OFF	• When SW3-4 is set to ON: Heating operation

(ii) The maximum frequency of outdoor unit in test run operation (At the time of rated capacity)

Model	FDCP224, 280 type
Maximum operation frequency (Hz)	95

Remarks : Fuzzy control is not performed in test run operation.
(Operation is executed.) Other controls are effective.

(b) Expansion valve control for oil return

After the compressor operated for 10 hours, and when the compressor is turned, stop the compressor to collect refrigerant oil, turn off the thermostat, and fully open indoor unit expansion valves of FAN and adnormally stopped units one by one. (Open expansion valves in the sequence that addresses were registered to outdoor units and not of the address number.

(c) High pressure control in heating operation

When (63H2) [2.84 close/2.26 open MPa] operates, the compressor revolution decrease 10 Hz, and outdoor unit fan stops preventing pressure increase. Frequency control is canceled after 6 minutes from reset of 63H2, then the compressor returns to the normal operation.

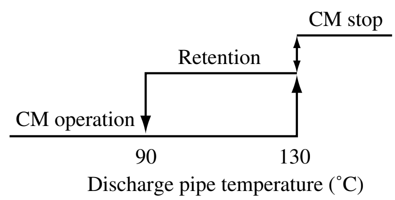
Note (1) Detail of Frequency Control Canceling Operation

When a high pressure control is canceled, the frequency increases 5 Hz, and the frequency is retained for 3 minutes. The frequency increases 5 Hz every 3 minutes to the normal operation.

(d) Discharge gas temperature control

1) When the discharge gas temperature (discharge gas thermistor : Tho-D) increases above the set point, the temperature (detected with Tho-D) is controlled by opening and closing the liquid bypass solenoid valve (SV1) and by lowering the frequency.
   - Tho-D > 115°C ....SV1-Open (Tho-D < 108°C Closes)
     The expansion valve of operating indoor unit open 5% approx.
   - Tho-D > 120°C ....The frequency is lowered 10Hz each time at intervals of 2 minutes (Lower Limit: 35 Hz of the full load or Partial load.) (Tho-D = < 115°C are canceled)
   - Tho-D > 130°C.......abnormal stop
     (The operation can be resumed at a temperature bellow 90°C)

2) Discharge pipe temperature error
   - When the discharge pipe temperatures (Tho-D detection) rise beyonnd 130˚C and is maintained for 2 seconds, the compressors are stopped but it will be reset if the temperatures drop below 90˚C.



   - If the discharge pipe temperature (Tho-D detection) occurs twice within 60 minutes or the condition higher than 130˚C has continued for 60 minutes including the duration of time of compressor stop, the unit operation is stopped with the error stop.

Note (1) Unless the temperature of 90˚C or under is maintained for 45 minutes after the discharge pipe error, the unit cannot be started again. (Reset the power supply to clear.)

(e) Compressor control at the during of startup

(i) Inrush current the compressor with 5Hz to the starting.

Also, at the time of startup, fully open the expansion valve of the indoor unit in the operator cab for 4 minutes.

(ii) Protective start of compressor

When the inverter starts, the compressor start under protection.

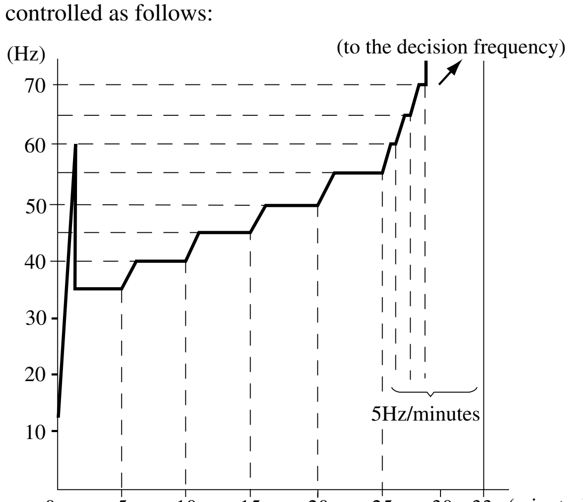
Operate with hot gas bypass up to 35 Hz after the start, operate with full loads of 60 Hz for 15 seconds, then operate with the decision frequency. When the frequency is higher than 65 Hz, they operate with 65 Hz for one minute 45 seconds after the start. But when the compressor starts first time after the power is turned on, and when the compressor starts after stop for more than 6 hours, it increases the frequency 5 Hz each minute for 13 minutes.

(iii) Three minutes delay timer

The compressor (inverter) will remain in stop state for 3 minutes, when the compressor is stopped by thermostat, ON/OFF swich, and /or by occurrence of trouble. When the power source is turned ON, the 3-minutes delay timer is cancelled.

(f) Detection control of electricity supply to crankcase heater

When an operation starts less than 6 hours after the power is turned on (electricity is supplied to CH), the frequency is controlled as follows:



Note(1) When the operation stops within 33 minutes, this control is executed at the time of the second or later startup.

(g) Open-phase protection

When the T-phase voltage of the secondary side of 52C is 0V, an abnormal stop will occur and the inspection displays (Remote controller : E34, indoor unit green LED : Continuous flashing, red LED : OFF, outdoor unit green LED : red LED : 2 times flash) will appear.

(h) Current safe control

The operation current is automatically controlled.
When the operation current at the converter inlet increases, the frequency is lowered 5 Hz by 5 Hz so that the operation current does not increase above the set point.
Lower limit frequency: Partial load 35 Hz

1) Retain the operations with Partial load of 35 Hz for 3 minutes, and when it is foud to be the current safe value, stop the inverter, operate them with Partial load 3minutes later for 3 minutes. When the frequency is below the current safe value, operate them with full loads of 35 Hz, cancel the frequency control to bring them back to the normal operation.
2) When the decision frequency under the fuzzy control get lower than the current safe frequency during a current safe control, bring them back to the normal operation. When the current value comes to the current cancel value during a current safe control, retain the frequency for 3 minutes, then cancel the frequency control.

(i) Current cut control

This control aims to prevent over current in the converter. When the current increases above the set point, stop the inverter immediately, then let is reset by itself 3 minutes later. After the self-reset, start the inverter with 35 Hz, and increase the frequency 5 Hz every 3 minutes to let it return to the fuzzy indication frequency. When the current is cut four times in 15 minutes, turn off 52C bring it to an abnomal stop and the inspection displays (Remote controller : E42, indoor unit green LED : Continuous flashing, red LED : OFF, outdoor green LED : Continuous flashing,and red LED : 1 time flash will appear.

(j) Protection of power transistor from overheat

When the temperature of the power transistor increases to the set temperature, stop the inverter immediately and let is reset by itself 3 minutes later. If the power transistor is overheated again within 2 hours, turn off 52C, bring it to an abnormal stop and the inspection displays (Remote controller : E41, indoor unit green LED : Continuous flashing, red LED : OFF, outdoor unit green LED : Continuous flashing, red LED : 4 times flash) will appear.

(k) Protection of number of connected indoor units

When the number of connected indoor units exceeds the quantities shown in the table below, they will come to an abnormal stop, and the inspection displays (Remote controller E43, indoor unit green LED : Continuous flashing, red LED : OFF, outdoor unit green LED : Continuous flashing, red LED : 7 times flash) will appear.

	FDCP224HKXRE2A 224HKXRE2V	FDCP280HKXRE2A 280HKXRE2V
Number of connected units	12 units	16 units

(l) Frost prevention during cooling

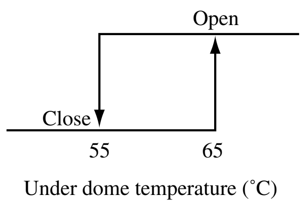
To prevent frost during a cooling operation, check temperature (to be detected with Th_{I-R}) of the indoor unit heat exchanger and lower the frequency of indoor unit (opening of expansion valve) when the temperature drops below 3°C.
When the heat exchanger temperature is below 2°C for more than 2 minutes, turn off the thermostat and start a fan operation. If the heat exchanger temperature rises above 16°C after the thermostat is turned off, reset it to a cooling operation.
But this operation shall not be executed for 10 minutes after the thermostat is turned on.
Also when temperatures of standing units have been below 2°C for an hour in succession, turn off the compressor for 3 minutes.

(m) Control of temperature under dome

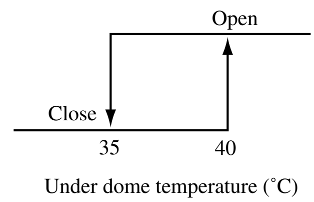
The liquid bypass solenoid valve (SV1) and the electronic expansion valve are controlled by the temperature detected by the under dome thermistor (Th_0-C) mounted on the compressor.

1) Solenoid valve control

● Full load

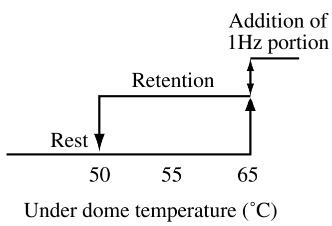


● Partial load

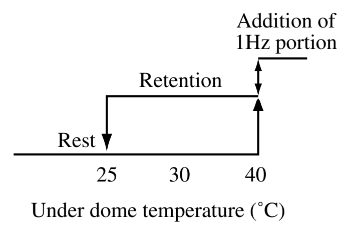


2) Electronic expansion valve control

● Full load



● Partial load



2.5 APPLICATION DATA

SAFETY PRECAUTIONS

- Please read these "Safety Precautios" first then accurately execute the installation work.
- Though the precautionary points indicated herein are divided under two headings, ⚠WARNING and ⚠CAUTION, those points which are related to the strong possibility of an installation done in error resulting in death or serious injury are listed in the ⚠WARNING section. However, there is also a possibility of serious consequences in relationship to the points listed in the ⚠CAUTION section as well.
  In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.
- After completing the installation, along with confirming that no abnormalities were seen from the operation tests, please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the owner's manual. Moreover, ask the customer to keep this sheet together with the owner's manual.

⚠ WARNING

- **This system should be applied to places of office, restautant, residence and the like. Application to inferior environment such as engineering shop could cause equipment malfunction.**
- **Please entrust installation to either the company which sold you the equipment or to a professional contractor. Defects from improper installations can be the cause of water leakage, electric shocks and fires.**
- **Execute the installation accurately, based on following the installation manual. Again, improper installations can result in water leakage, electric shocks and fires.**
- **When a large air-conditioning system is installed to a small room, it is necessary to have a prior planned countermeasure for the rare case of a refrigerant leakage, to prevent the exceeding of threshold concentration.**
  In regards to preparing this countermeasure, consult with the company from which you purchased the equipment, and make the installation accordingly. In the rare event that a refrigetant leakage and exceeding of threshold concentration does occur, there is the danger of a resultant oxygen deficiency accident.
- **For installation, confirm that the installation site can sufficiently support heavy weight. When strength is insufficient, injury can result from a falling of the unit.**
- **Execute the prescribed installation construction to prepare for earthquakes and the strong winds of typhoons and hurricanes, etc. Improper installations can result in accidents due to a violent falling over of the unit.**
- **For electrical work, please see that a licensed electrician executes the work while followig the safety standards related to electrical equipment, and local requlations as well as the installation instructions, and that only exclusive use circuits are used.**
  Insufficient power source circuit capacity and defective installment execution can be the cause of electric shocks and fires.
- **Accurately connect wiring using the proper cable, and insure that the external force of the cable is not conducted to the terminal connection part, through properly securing it. Improper connection or securing can result in heat generation or fire.**
- **Take care that wiring does not rise upward, and accurately install the lid/service panel. Its improper installation can also result in heat generation or fire.**
- **When setting up or moving the location of the air-conditioner, do not mix air etc. or anything other than the designated refrigerant within the refrigeration cycle.**
- **Always use accessory parts and authorized parts for installation construction. Using parts not authorized by this company can result in water leakage, electric shock, fire and refrigerant leakage.**

⚠ CAUTION

- **Execute proper grounding. Do not connect the ground wire to a gas pipe, water pipe, lightning rod or a telephone ground wire. Improper placement of ground wires can result in electric shock.**
- **The installation of an earth leakage breaker is necessary depending on the established location of the unit. Not installing an earth leakage breaker may reslut in electric shock.**
- **Do not install the unit where there is a concern about leakage of combustible gas.**
  The rare event of leaked gas collecting around the unit could result in an outbreak of fire.
- **For the drain pipe, follow the installation manual to insure that it allows proper drainage and thermally insulate it to prevent condensation. Inadequate plumbing can result in water leakage and water damage to interior items.**

2.5.1 Installation of indoor unit

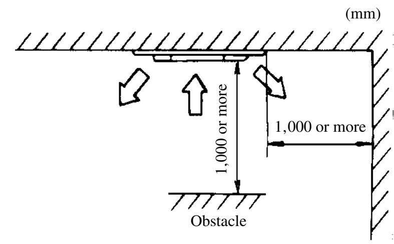
(1) Ceiling recessed type (FDT)

(a) Selection of installation location

Model	Space above ceiling (h)
FDT28, 36, 45, 56, 71, 90	Over 270mm
FDT112, 140	Over 330mm

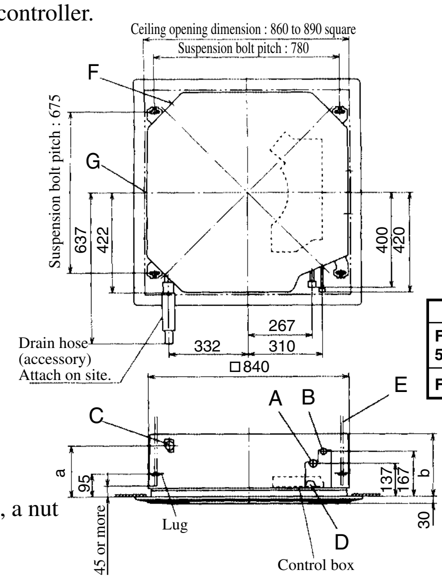
1) Select location where the space above ceiling is larger than those mentioned below and perfect draining can be assured.
2) Places where perfect drainage can be prepared and sufficient drainage gradient is available.
3) Places free from air distrubances to the air inlet and outlet of the indoor unit.
4) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%. (When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)
5) Do not place where the unit is exposed to oil splashes or steam (e.g. kitchens and machine plants). (Istallation and use at such places will causes the performance drop, corrosion in the heat exchanger and damage in molded synthetic resin parts.)
6) Do not place where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.
7) Do not place adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals, Generated noise may cause malfunctioning of the controller.

• Installtation space



(b) Preparation for installation

1) Ceiling hole size and Position of suspension bolts.
   a) The pattern sheet may shrink or expand as humidity changes, so check the actual size before use.
   b) The size of ceiling opening can be adjusted within the range shown below. Bring the unit body to the ceiling opening right in the center so as not to be set aside and so that space between a ceiling opening end and the outside of the unit body becomes equal to that on the opposite side.
   c) The size of the pattern sheet equals to the maximum size of the square ceiling opening.
2) Location of pipes
   For the location of pipe, see the exterior dimension.



A	Gas refrigerant piping
B	Liquid refrigerant piping
C	Drain piping connecting hole
D	Power intake hole
E	Suspension bolt
F	Outside air intake hole
G	Supply air branch duct connecting hole

Unit : mm

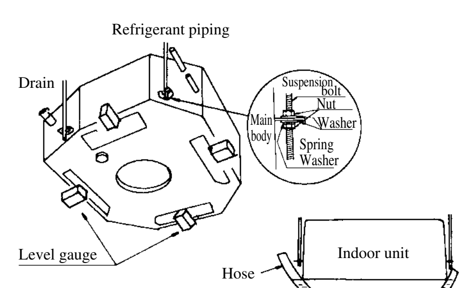
Model	a	b
FDT28, 36, 45, 56, 71, 90	210	260
FDT112, 140	270	320

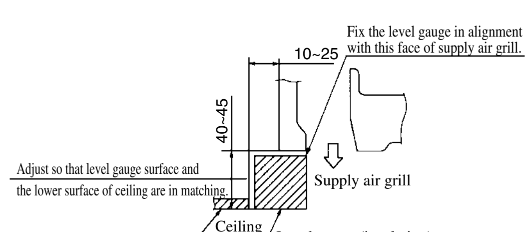
(c) Suspension

- Arrange four sets of a suspension bolt (M10 or M8), a nut for it, a plain washer and a spring washer on site.

When there is the ceiling

1. Make an 860 to 890 mm-square cutout on the ceiling.
   Refer to the outside dimensions of packing cardboard container.
   ▶ Align the center of ceiling cutout and the center of unit.
2. Decide the hang bolt position (675 × 780).
3. Use four hang bolts and fix them so that each bolt can resist the pull out load of 50 kgf.
4. Decide the length of hang bolt to approx. 70 mm above the ceiling surface.
5. After hanging in the unit, fix the attached level gauge and secure the height of unit.
6. Use a transparent hose filled with water to check the levelness of unit. (The maximum allowable height difference between both ends of unit is 3 mm.)





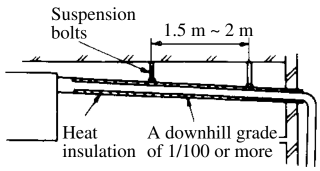
Request

- For the hang bolt whose length exceeds 1.3m, use the M10 size hang bolt and moreover combine a diagonal member to the hang bolt for reinfocement.

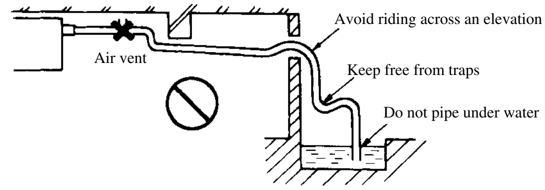
(d) Drain Piping

1) Drain piping should always be in downhili grade (1/50 ~ 1/100) and avoid riding across and elevation or making traps.

• Good piping

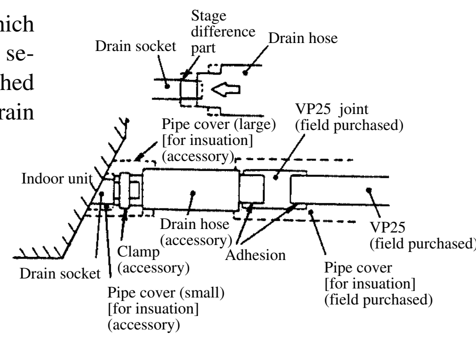


• Improper piping



2) When connecting the drain pipe to unit, pay sufficient attention not to applay excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

3) For drain pipe, use hard PVC general purpose pipe VP-25(I.D.1”) which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).

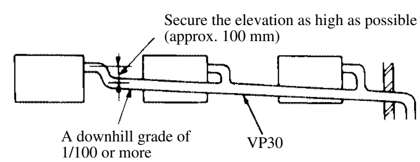


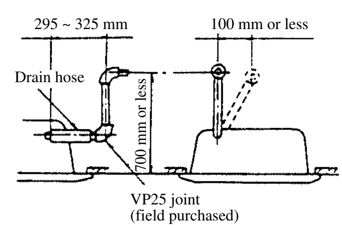
4) When consturcting drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch. Use VP-30(11/4”) or thicker pipe for this purpes.

5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

6) Do not ever provide an air vent.

7) The height of the drain head can be elevated up to a point 700 mm ablve the ceiling and, when an obstacle exisits in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-flow quantity of drain at the event of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe within the distance given in the sketeh below.





8) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

9) The purpose of drain hose is to absorb minute discrepancy of the unit or the drain piping occurred when they are installed. Therefore, when it is bent intentionally or used under expanded condition, it may be damaged and result in water leakage.

Drainage test

① Conduct a drainage test after completion of the electrical work.

② During the trial, make sure that drain flows properly through the piping and that no water leaks from connections.

③ In case of a new building, conduct the test before it is furnished with the ceiling.

④ Be sure to conduct this test even when the unit is installed in the heating season.

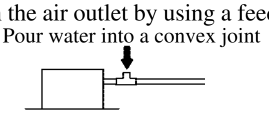
Forced drain pump operation

① Turn on dip switch 5-3 on the PCB of the indoor unit. The drain pump operates continuously.

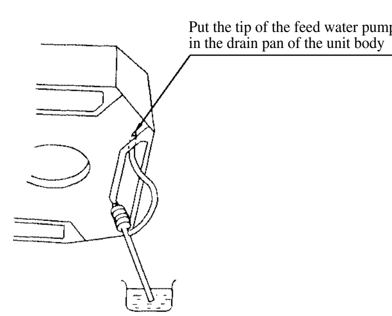
② After the test, be sure to turn off the dip switch.
(If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)

Procedures

① Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.



(If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet.
Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.)



② Check at the exhaust port if drain is flowing.

(Note) Conduct this test paying attention to rotating sound of the drain motor.

③ Remove the drain plug located on the bottom of the drain pan when the water has to be evacuated from the unit.

④ After the test, fit the drain plug to the original place and turn off the power source.

(e) Fixing of Decorative Panel (The panel fixing bolts are attached on the panel.)

1) Check with the accessory level gauges that indoor unit height and the size of ceiling hole are correct.
   - Remove the level gauges from the indoor unit before fixing the decorative panel.
2) Screw two bolts out of four accessory bolts less than 5 mm in the indoor unit diagonally.
3) Hang the panel on the two bolts and fix them temporarily.
4) Tighten the bolts fixed temporarily and the remaining two bolts.
   - Screw the remaining two bolts, and tighen all (four) bolts.
5) Connect the louver motor connector (red) to the panel respectively.
6) If the louver motor is not operated by remote control, check if the connector is connected correctly, and turn off the power for more then 10 seconds, then reset it.

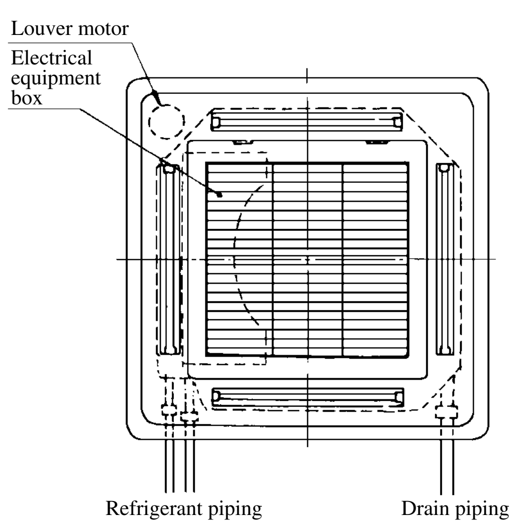
Panel joint setting

- The panel can turn 30 mm to the left and to the right in all (approx 2°), and the indoor unit turns 30 mm to the left and to the right in all (approx 3°), But, it cannot turn if the panel is secured.

Limit in fixing panel

① Fix the panel only in the direction shown in the figure.

② If it is fixed in other way, air will leak. Also, wires cannot be connected for auto swing and receiver amp.



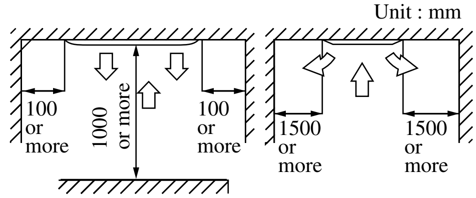
(2) 2-way outlet ceiling recessed type (FDTW)

(a) Selection of installation location

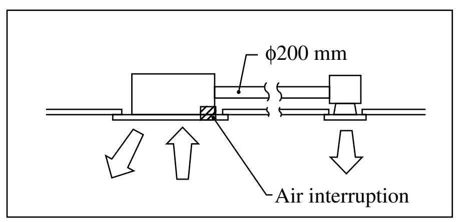
1) This unit is a ceiling surface direct return air and direct supply air type.

Install the unit a place the allows air to reach every part of the room, in accordance with the shape and heigh of the room.

- **Installation space**



2) This unit permits connecting a branch duct (ϕ200 mm) according to the method shown in the figure below so that air disribution may be improved to the shape of the room. (For the connecting port of the duct, refer to the exterior dimension on page 37 ~ 39.)



3) Cold air throw

Unit : m

Item \ Models	FDTW28, 45, 56	FDTW71, 90	FDTW112	FDTW140
Standerd	4.0	4.5	4.7	5.0
UHi	4.5	5.0	5.2	5.5

Note (1) The cold air throw is the same in 2 directions.
Conditions:
1.Unit height: 3.0 m above the floor
2.Fan speed: Hi
3.Location: Freee space without obstacle
4.The throw is as the per the table above.
5.Air velocity at the throw: 0.3(m/s)

4) Places where chilied or heated air circulates freely. When the installation heiht exceeds 3.5m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

5) Places where perfect drainage can be prepared and sufficient drainage gradient is available.

6) Places free from air disturbances to the return air port and supply hole of the indoor unit, places where the fire alarm may not malfunction to short circuit.

7) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%. (When installing at a place under a high humidity environment, pay suffcient attention to prevention of dewing such as thermally insulating the unit properly.)

8) Places exposed to oil splashes or steam (e.g. kitchens and machine plants.)
Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

9) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

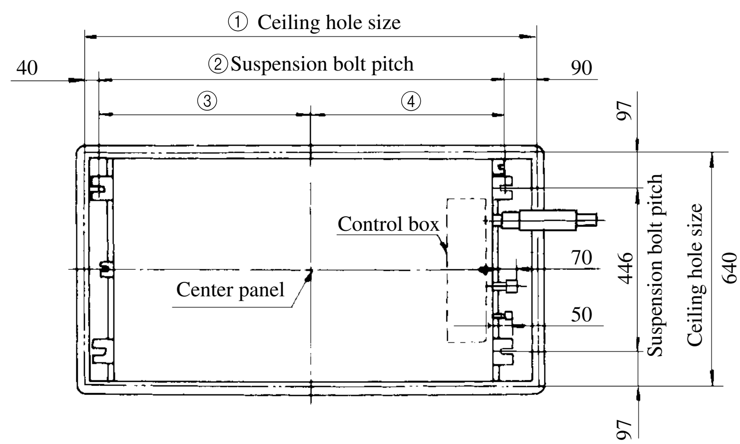
10) Place adjacent to equipment generating electromagnetic waves or high-frquency waves such sa in hospitals. Generated noise may cause malfunctioning of the controller.

(b) Preparations for installation

1) Ceiling hole and suspension bolt positions

a) The pattern sheet shrinks or expands as humidity changes, so check the actual size before use.

b) The ceiling hole sizes and suspension bolt sizes are shown in the following figure.



Dimension table

Unit : mm

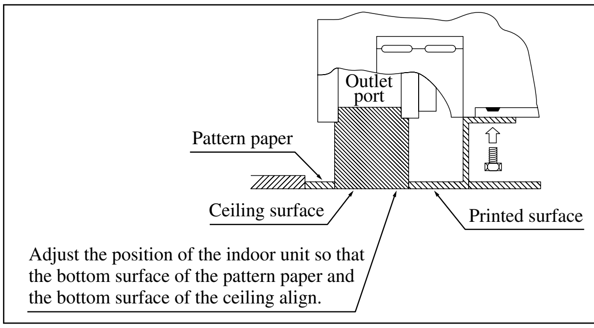
Mark / Models	①	②	③	④
FDTW28, 45, 56	1015	885	468	417
FDTW71, 90	1260	1130	590	540
FDTW112, 140	1730	1600	825	775

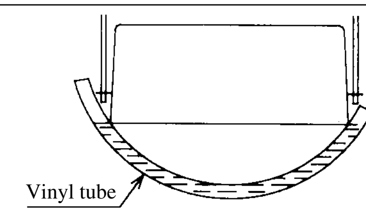
(c) Installation

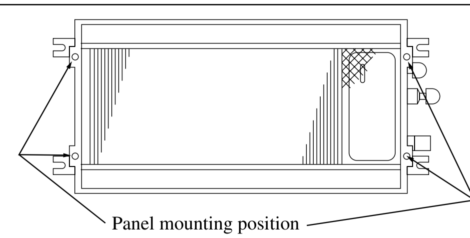
For the suspension bolt, use four M10 or W 3/8 bolts and secure so that each bolt can withstand a 50 kg/f pullout load.
Use a suspension bolt length that extends approximately 95 mm for the ceiling surface.

A. If there is a ceiling

1) Open the hole in the installation location to the ceiling opening dimensions.
2) Install the suspension bolts (procured locally) at the designated locations.
   (Use care as the center of the spacing for the suspension bolts is not at the center of the panel.)
3) Hang the unit, use the four bolts to mount the pattern paper provided to the panel mounting section and adjust the height.
4) Use a level or transparent hose with water in it to confirm that the unit is level. If the unit is not level, problems such as water leakage or improper operation of the float switch could occur.
5) After confirming the above, secure the unit in position.



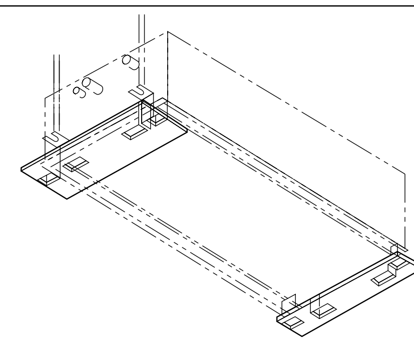




<Panel mounting position>

B. If ceiling is to be installed later

1) Follow steps A2 to A4 in the previous section "A. If there is a ceiling" to install the unit and mount the pattern paper.
2) When the ceiling is installed, the outer perimeter of the pattern paper can be referred to for making the opening in the ceiling.
3) After checking the height and that the unit is level, secure the unit in position.

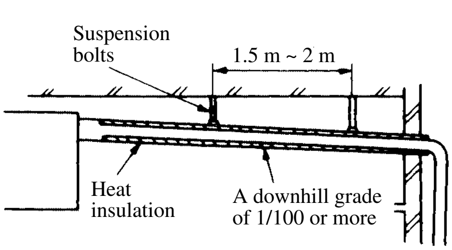


<Pattern paper mounting configuration>

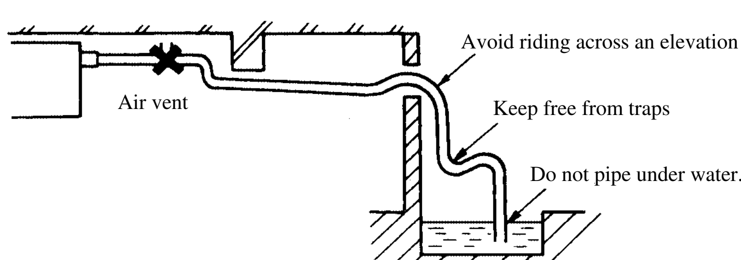
(d) Drain piping

1) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or making traps.

- **Good piping**

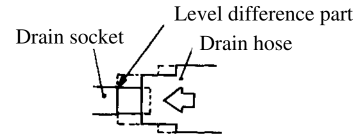


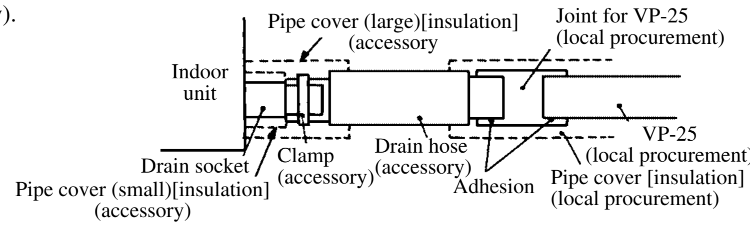
- **Improper piping**



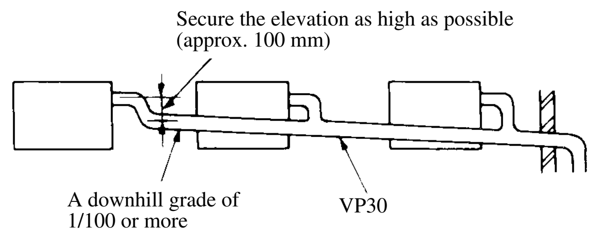
2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

3) For drain pipe, use hard PVC ganeral purpose pipe VP-25 (I.D.1") which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securly using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).





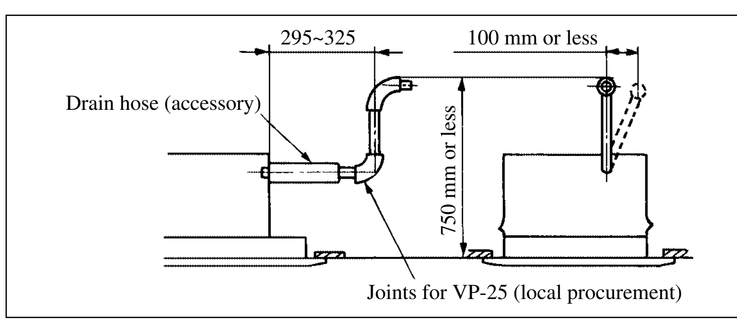
4) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicker pipe for this pupose.



5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

6) Do not ever provide an air vent.

7) The height of the drain head may be elevated up to a point 750mm above the ceiling and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-fiow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe withing the distance given in the drawing below.



8) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

When using a natural drain port

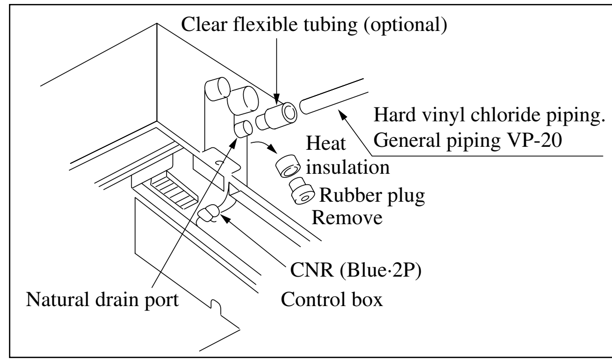
1) Remove the heat insulating material and rubber plug of the natural drain port.

2) By using the natural drain connecting tube (option), connect the drain pipe (VP-20) and completely clamp it with a clamp.

Note (1) If the drain pipe is directly connected to the natural drain port, the drain pan becomes unremovable.

3) Disconnect the connector CNR (blue, 2P) for the drain motor.

Note (1) If the connector remains connected, drain water is discharged from the standard pipe connecting port, leading to water leakage.



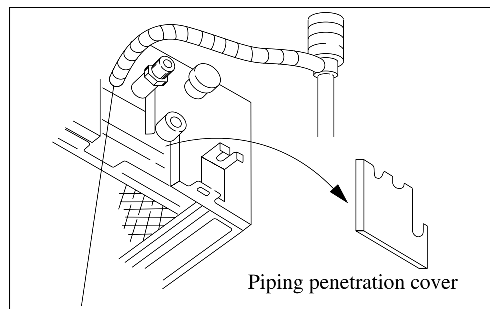
Drainage test

When using the standard drain port, execute a drainage test after completion of electric work.

① During the test run, make sure that drain flows properly through the piping and that no water leaks from connections.

② Be sure to conduct this test even when the unit is installed in the heating season.

③ In case of a new building, conduct the test before it is furnished with the ceiling.



Insert the tip of the supply water pump approximately 50 mm in a downward direction.

1) Inject about 1,000cc by using a feed water pump from the grommet on the drain pump side.

2) At the drain port (transparent portion), check if drainage is performed.

3) After completion of the drain test, completely perform heat insulation fot the drain pipe up to the indoor unit.

Forced drain pump operation

① Turn on dip switch (SW5-3) on the PCB of the indoor unit. The drain pump operates continuously.

② After the test, be sure to turn off the dip switch.

(If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)

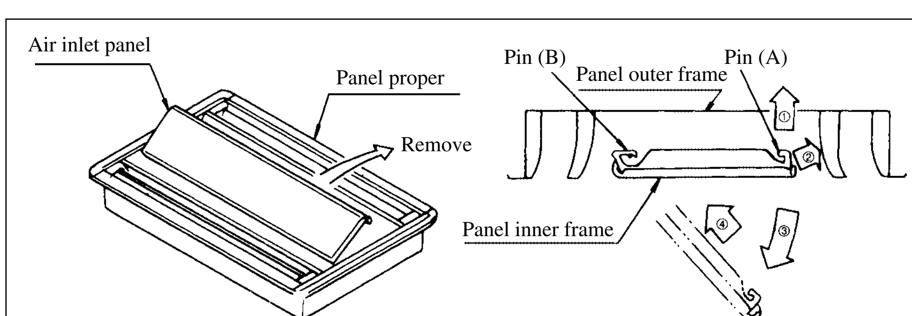
(g) Fixing of Panel (The panel fixing bolts are attached on the panel.)

Note (1) Care should be exercised in handling the supply air port on the panel because it is easily depressed by finger nail.

1) Check with the accessory level gauges that the indoor unit height and the size of ceiling hole are correct.

Notes (1) Remove the level gauge from the indoor unit befroe fixing the panel.
(2) Remove the Air inlet panel from the panel proper.

Procedure for dismounting the air inlet panel



a) Remove the panel from the pin (A) in the order of the arrows ① and ②.

b) Open the panel slightly as shown by the arrow ③ and move it to the arrow ④. Then remove it from the pin (B).

2) Screw two bolts out of four accessory bolts less than 5mm in the panel diagonally.

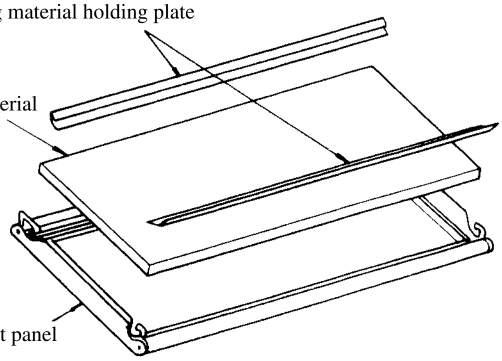
3) Hook the panel on the two bolts and set it temporarily.

4) Tighten the bolts fixed temporarily and the remaining two bolts.

5) Connect the louver motor connector (white, 3P) and the limit switch connector (white, 2P) to the panel respectively.

6) When the louver motor cannot be operated by remote controller operation, check the connector connections and turn off the power suppy for 10 sceonds or more for restting.

For ceiling material inlaid panel



● Ceiling material dimensions

Unit : mm

Item \ Models	FDTW28, 45, 56	FDTW71, 90	FDTW112, 140
Width	300	300	300
Length	970	1215	1685

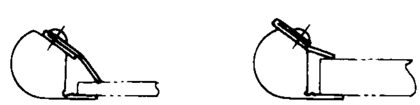
① Remove the air inelt panel from panel proper.

② Remove the ceiling holding plates (2 sheets) temporarily set on the suction panel with screws.

③ Install the ceiling material on the air intel panel and fix it with the ceiling holding plates so as not to produce any play.

Note (1) Use a ceiling material with a thickness of 6-15mm and a side length of 300mm or more.

Ceiling material thickness : 6-10 mm   10 ~ 15 mm



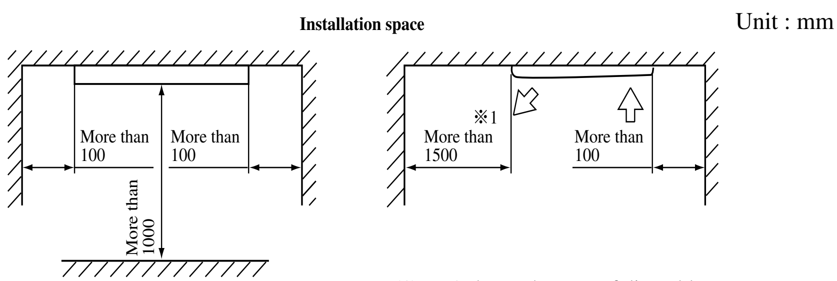
Ceiling material instaling direction

(3) Ceiling recessed single air supply port type (FDTQ)
Models FDTQJ22HKXE3, 28HKXE3, 36HKXE3

(a) Avoid the following locations for installation and uses

1) Locations where oil splashes and moisture are abundant (e.g., kitchens, mechanical workshops).
   These locations may result in corrosion and lower performance of the heat exchanger and cause damage to plastic parts.
2) Locations with corrosive gases (such as sulfurous acid gas), flammable gases (such as thinners, gasoline) and areas where there are possibilities of gas accumulation. These locations can result in corrosion of the heat exchanger and damage plastic parts. Also, the flammable gas could cause a fire.
3) Locations near medical equipment radiating electromagnetic waves in hospitals or other facilities, and around appliances emitting high frequencies. The electromagnetic noise may cause the controller to malfunction.
4) Locations exposed to sea breezes (seaside areas). Sea breezes may cause corrosion of the outer frame and the heat exchanger.

(b) Installation space for the indoor unit



Note (1) ※1 shows the case of direct blow.

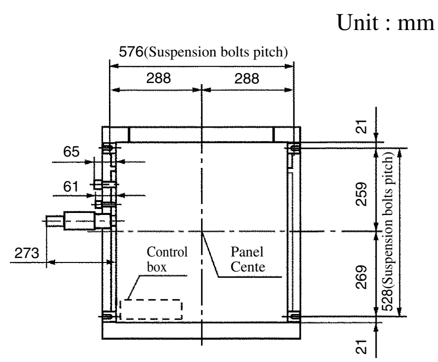
1) With the customer's consent, select a suitable location according to the following conditions.
   - Where cool air or hot air can easily pass through.
     If the height of the location exceeds 3 m, hot air will gather below the ceiling. Suggest to the customer to also install a circulation fan.
   - Where wiring and plumbing to outdoor areas may easily be conducted.
   - Where water can be completely drained. A sloping location for drainage.
   - Where there is no wind disturbance to the suction inlet and blowing outlet, the fire alarm will not be set off erroneously, and no short circuits occur.
   - Where there is no direct sunlight.
   - Where the ambient dew point temperature is below 28°C and the relative humidity is below 80%.
     (The unit has been tested according to JIS dew point conditions and has been confirmed to operate without any problems. However, if the unit is operated in an environment with a humidity higher than the above limit, condensation may occur. Accordingly, all pipes and drain pipes should be further covered with insulation materials 10 - 20 mm thick.)
2) Consider the supporting strength of the location. If the strength is not sufficient to sustain the unit weight, use reinforcing materials.

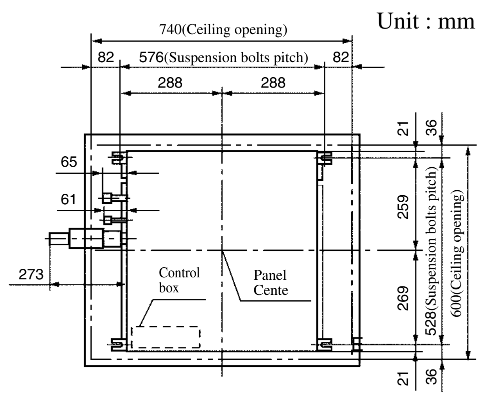
(c) Suspension the unit

Use four (4) M10 or W3/8 suspension bolts. Secure them firmly so that each can withstand a pull-out load of 50 kg/f.

Adjust their length to approximately 40 mm from the ceiling.

- For TQ-PSA-13W-E panel
- For TQ-PSB-13W-E panel





1) When hanging from the ceiling

a) The panel has two types: for 2 × 2 grid ceiling and for conventional ceiling.

① When installing on a 2 × 2 grid ceiling, put in the unit on an angle, or hang the unit with the T bar temporarily removed.

When installing on a conventional ceiling, cut an installation opening (740 mm × 600 mm) in the ceiling, and hang the unit.

b) Set the suspension bolts (to be prepared at job site) in place.

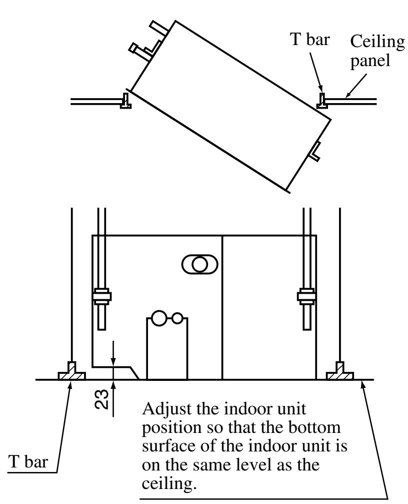
c) Adjust the unit's height so that the bottom surface of the unit is on the same level as the ceiling (bottom surface of the T bar). (The blow outlet is contained in the ceiling.)

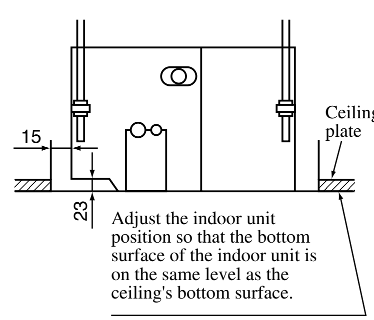
The allowable difference in height between the bottom surface of the ceiling and that of the indoor unit is when the indoor unit face is no higher than 5 mm.

Caution

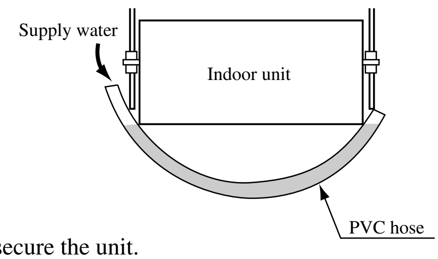
Do not install the indoor unit lower than the bottom surface of the ceiling.

- For TQ-PSA-13W-E panel
- For TQ-PSB-13W-E panel





d) Level the unit using a hose filled with water. If the unit is out of level, water leaks or malfunctioning of the floating switch may occur.



e) After ensuring the above, secure the unit.

2) When embedded into ceiling

a) Install the unit following steps b) and c) of the above part 1).

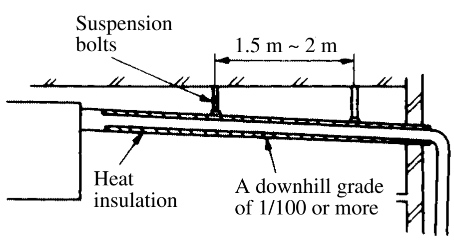
b) When installing on a conventional ceiling, cut an installation opening (740 mm X 600 mm) in the ceiling.

c) Check the installation height and level, and after that, secure the unit.

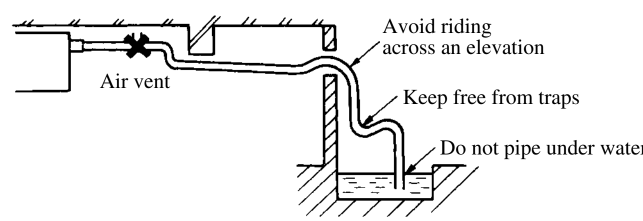
(d) Drain piping

1) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or making traps.

- **Good piping**

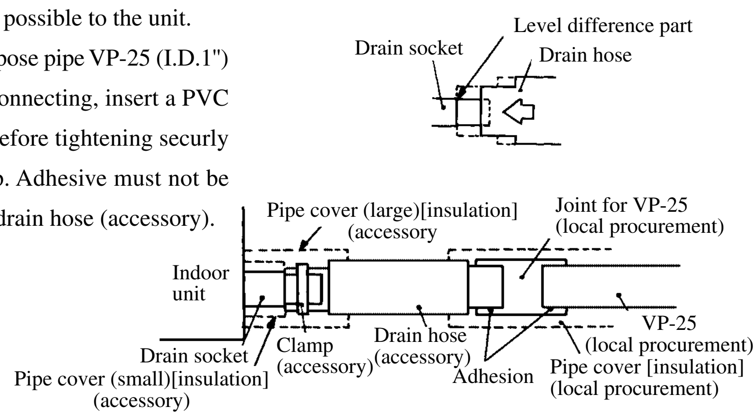


- **Improper piping**

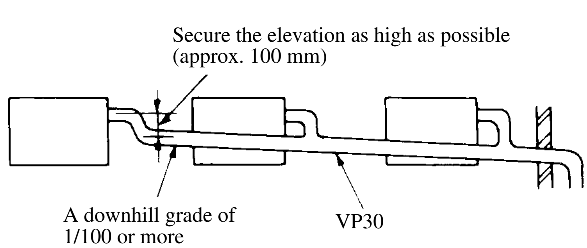


2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

3) For drain pipe, use hard PVC ganeral purpose pipe VP-25 (I.D.1") which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securly using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).



4) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicker pipe for this pupose.

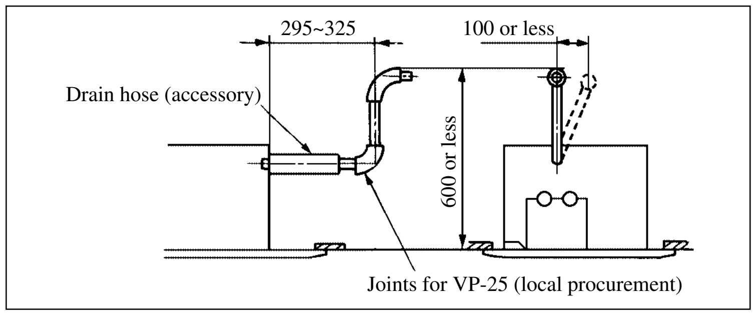


5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

6) Do not ever provide an air vent.

7) The height of the drain head may be elevated up to a point 600mm above the ceiling and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-fiow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe withing the distance given in the drawing below.

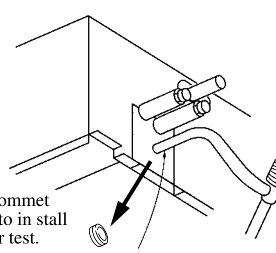
Unit : mm

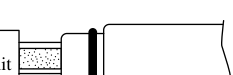


8) Avoid positioning the drain piping outlet at a place where ganeration of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

(e) Drain test (Perform the drain test after the electrical wiring work has been finished.)

- Check that water is draining thoroughly during the test run, and that there are no water leaks from the joints.
- The test has to be performed even if the unit is installed in a season when the unit is used for heating.
- In a new house, perform the test before the ceiling is fitted.





1) Remove the grommet, and using a water pump, pour about 1000cc of water, from the position shown in the left figure.

   Caution

   When pour water, be sure to perform the drain pump forced operation.

2) Check the drain-out section (transparent section) for normal flow of drainage.

3) Take off the drain plug to release the water. After water release has been confirmed, replace the drain plug as it was.

   ※ Be careful not to get splashed when pulling the drain plug.

4) After the drain test, thoroughly insulate the drain pipe, up to the main unit.

Forced drain pump operation

- Turn on dip switch SW5-3 on the PCB of the indoor unit. The drain pump will operates continuously.
- After the drain test, be sure to turn off the dip switch.

  (If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)

(f) Panel installation (Panel installing bolts are attached to the panel.)

① Check that the indoor unit's height and opening dimensions in the ceiling are correct.

② Check that level is ensured.

③ Open the suction grill.

④ Screw in two of the four suspension bolts attached to the panel, on the piping side and at its opposite angle, by a little less than 5 mm (● marks).

⑤ Hook the panel into two of the suspension bolts to pre-install it.
With pre-installation is performed, first hook the panel to bolt A, then to bolt B while rotating the panel.
(Take care so that the unit does not rotate during pre-installation.)

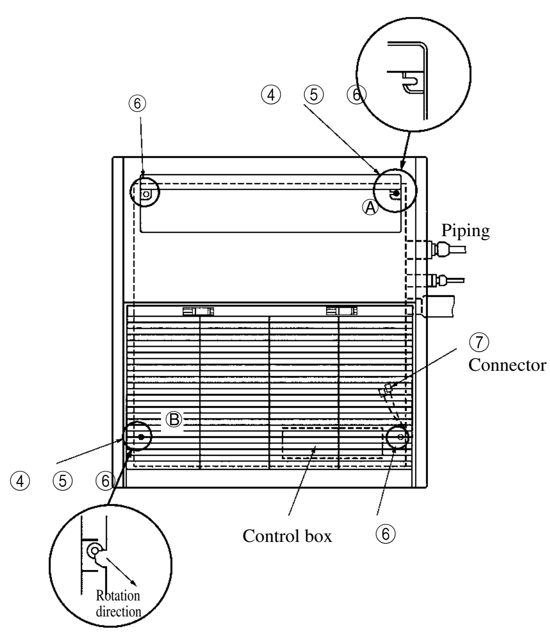
⑥ Tighten the pre-installed suspension bolts and two remaining suspension bolts.

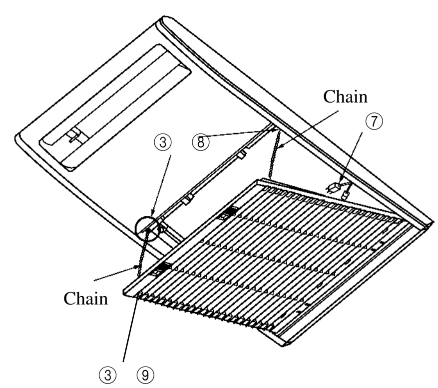
⑦ Attach the louver motor connector (white, 4P) and the limit switch connector (white, 2P).

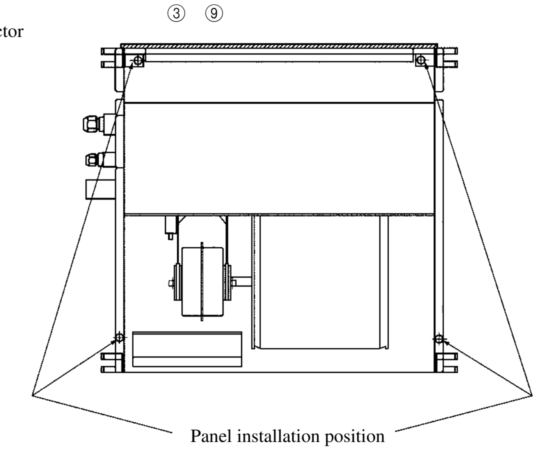
⑧ Use the provided screws to tighten chains to the panel. Chain installing screws is contained in the same bag as suspension bolts.

⑨ Close the suction grill. Now installation is complete.

⑩ When the louver motor does not operate with the remote control, check connections of the connectors, turn off the power for more than 10 seconds and reset.







(g) Indoor unit repair procedure for duct connection

1) Drill hole for duct

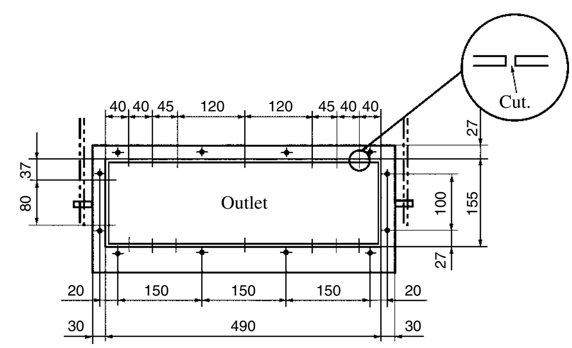
a) While referring to the following dimensions, notch the insulation. (The insulation is equipped with the marks in advance.)

b) Cut joints for the hole, and drill hole.

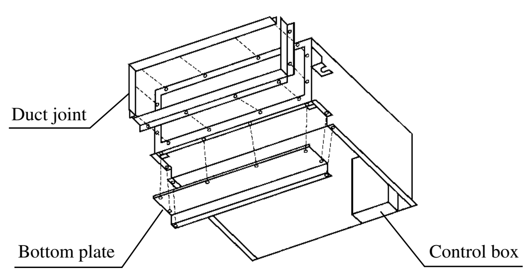
c) Connect the duct joint using screws attached to the panel.

Unit : mm

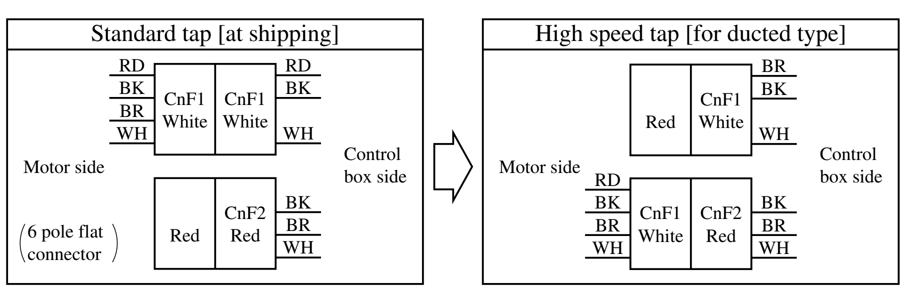
[Upward]



d) Connect the bottom plate using screws attached to the panel.



e) Replace connectors of the fan motor with those for duct connection, while referring to the figure below. The connectors are provided at the side of the control box.



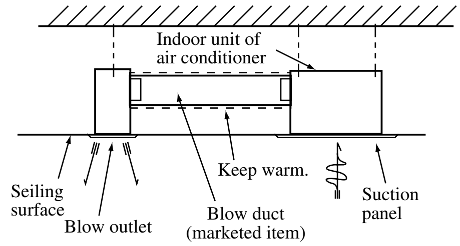
2) Duct work

a) Calculate air capacity and the outside static pressure to select the duct's length and shape, and blow outlet.

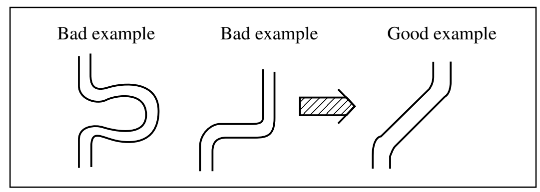
Caution

Take care that the outside static pressure does not exceed 30 Pa.

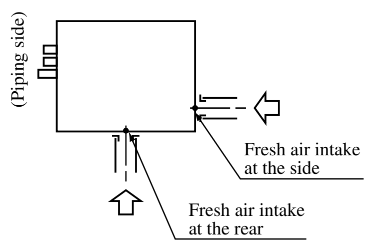
The unit has condensation owing to the decrease in air capacity, possibly causing the ceiling and household goods to become wet.



b) Reduce the number of bends as much as possible. (Corner R should be as larger as possible.)



c) Connecting the air inlet duct



d) Fresh air intake

- Use the intake, which is easier for work, either at the rear or the side.

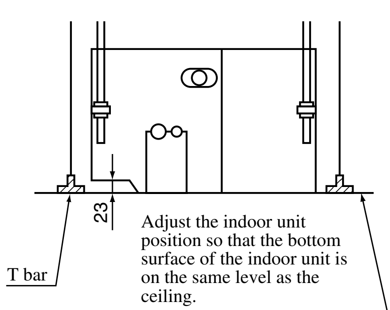
e) Duct connection

- Connect the 125 mm diameter round duct, using the air inlet/exhaust duct flange separately sold (for connecting the 125 mm diameter round duct). (Band clamp)
- Keep the duct warm to protect from condensation.

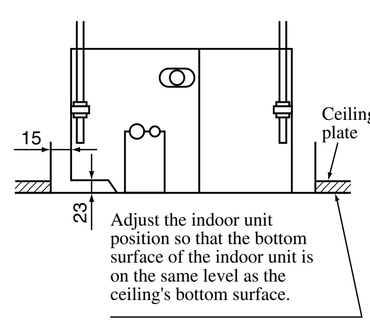
f) Checking of indoor unit installation level

1) There are two kinds of panel, which are TQ-PSA-13W-E panel and TQ-PSB-13W-E panel. When installing to the existing ceiling, check that opening dimensions in the ceiling are correct.
   Check the installation level of the air-conditioner indoor unit and the ceiling members.
2) Adjust the air-conditioner indoor unit height so that the under surface of the indoor unit and the under surface of the ceiling agree with each other. (The blowout port shall be housed in the ceiling.)
3) The allowable height difference between the under surface of the ceiling and the under surface of the indoor unit is less than 5 mm upward shift of the indoor unit.
   Do not install the indoor unit lower than the bottom surface of the ceiling.

- For TQ-PSA-13W-E panel



- For TQ-PSB-13W-E panel



g) Panel installation

① Insert a flat head screw driver, etc. into the slot on the blowout port cover of the panel to remove the cover from the panel.

② Open suction grill.

③ Screw in two of the four suspension bolts attached to the panel, on the piping side and at its opposite angle, by a little less than 5 mm (● marks).

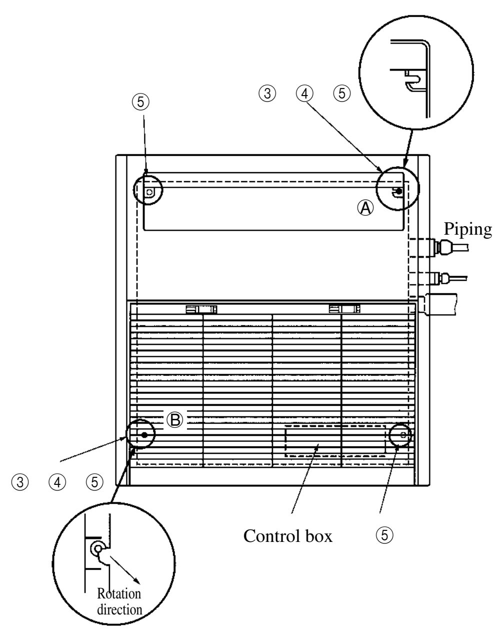
④ Hook the panel into two of the suspension bolts to pre-install it.
With pre-installation is performed, first hook the panel on the bolt A Then to the bolt B .While rotating the panel.
(Take care so that the unit does not rotate during pre-installation.)

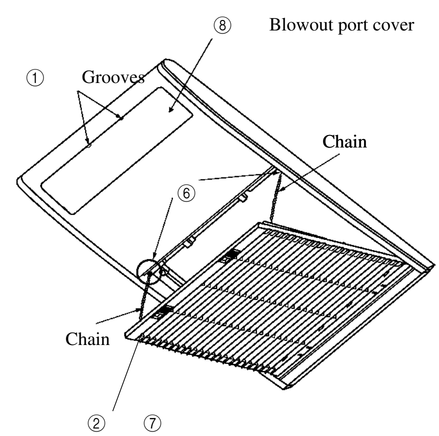
⑤ Tighten the pre-installed suspension bolts and tow remaining suspension bolts.

⑥ Use the provided screws to tighten chains to the panel. Chain installing screws is contained in the same bag as suspension bolts.

⑦ Close the suction grill. (Check whether the chain is installed securely.)

⑧ Push the blow outlet cover into place from the bottom of the panel, and fit it as it was.
Check that the blow outlet cover is securely fitted and does not fall.



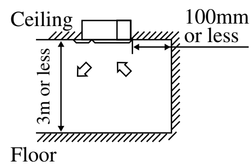
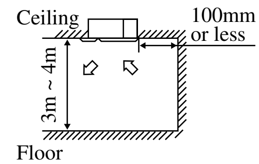


(4) 1-way outlet ceiling recessed type (FDTS)

Models FDTSJ45HKXE2B, 71HKXE2B

Preparation of indoor unit

It can be installed by either one of the following methods. Select the most adequate method for your particular case.

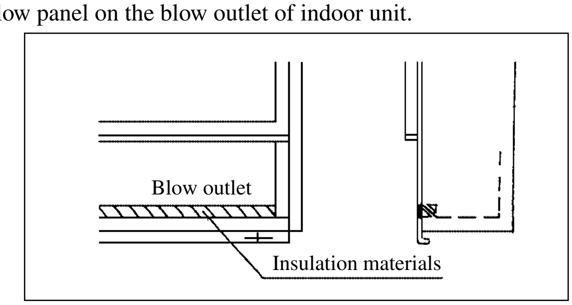
	Ⓐ Standard installation	Ⓑ Higher ceiling
Installation example and limitation		

Note (1) In the case of installing on the high ceiling, part of indoor unit requires some modification.

Procedures of rework

Installation on higher ceiling

Adhere the insulation materials attached to the direct blow panel on the blow outlet of indoor unit.



(a) Selection of installation location

1) Where cool and hot air will be distributed sufficiently.

   Where the installation heigh exceeds 3m, warmed air is likely to concentrate close to the ceiling. In such case, you should install also a circulator.

Reference • **Cold air throw**

Unit : m

Item / Models	Reaching distance	
	Standard	Higher ceiling
All models	7	

[Conditions] 1. Unit heigh

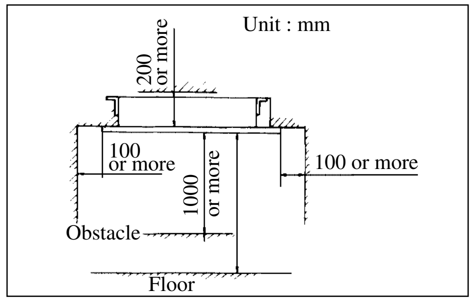
Standard ceiling: 2.4--3.0(m) above floor   Higher ceiling: 3.0--4.0(m) above floor

2. Kind of operation: Hi
3. Place: Free space without obstruction;
4. Reaching distance means the horizontal distance for the wind to reach the floor.
5. Wind velocity at the reaching distance: 0.5m/s

Note (1) Wind capacity is UHi in case of a higher ceiling. It is value of Hi for other cases.

2) Where the ceiling has sufficient rigidity.
3) Where there is no obstacles in front of the suction intel and blow outlet.
4) It should be avoided such places as kitchen, machine factory, etc. where there profuse liquid splashes or thick steam.
5) Where the height of ceiling exceeds 200mm.

6) Where a space as shown below can be secured.



7) It should be avoided where a machine generating high frequency waves is installed.

8) Select a place to branch the piping so that same distance will be a obtained for each of one way piping.

9) Where humidity may exceed 80% behind the ceiling or the dew point may exceed 28°C, adhere polyurethane foam materials (t 10 or more) over the insulation materials on the external plate.

10) Where it is convenient for the piping and wiring to the outdoor.

11) Where protected from direct exposure to sun beams.

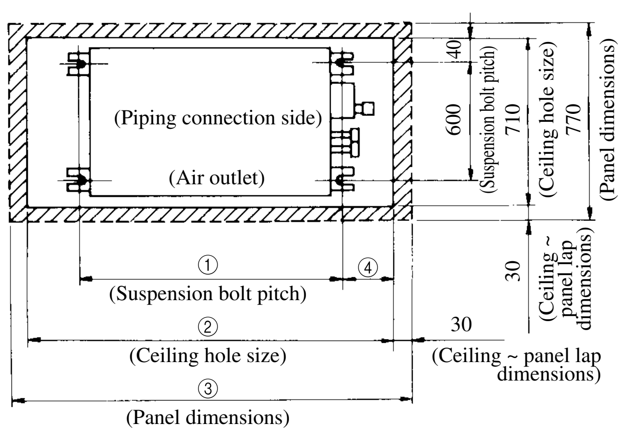
12) Where it is free from volatile gas generation.

(b) Standard location

1) Installation

a) Ceiling hole size and position of suspension bolt

Unit : mm

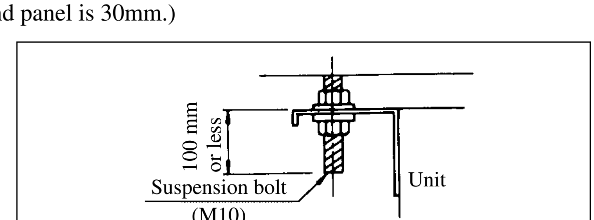


Unit : mm

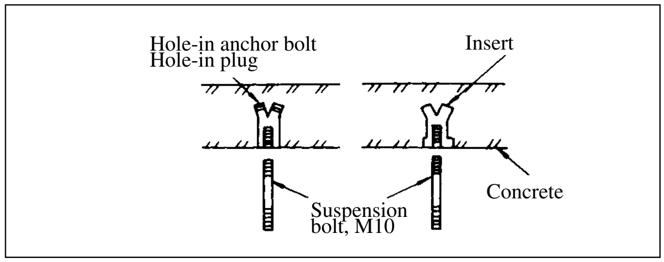
Models \ Mark	①	②	③	④
FDTS45	990	1230	1290	180
FDTS71	1250	1440	1500	145

b) Length of fixed suspension bolt (customer orderd parts M10)

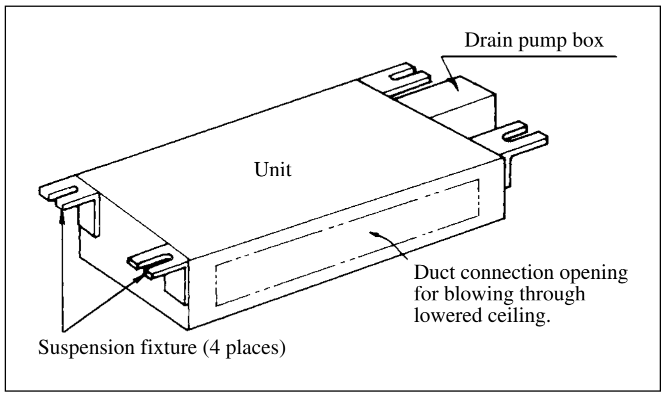
[Reference] Suspension bolt pitch is adjustable within ± 10mm in sidewise direction. Since there is no adjustment allowance in back and forth direction, determine the position exactly with a measure. (Lap margin between ceiling and panel is 30mm.)



c) Fixing of Suspension bolt. Fix the bolts securely as shown below or by any other adequate means.



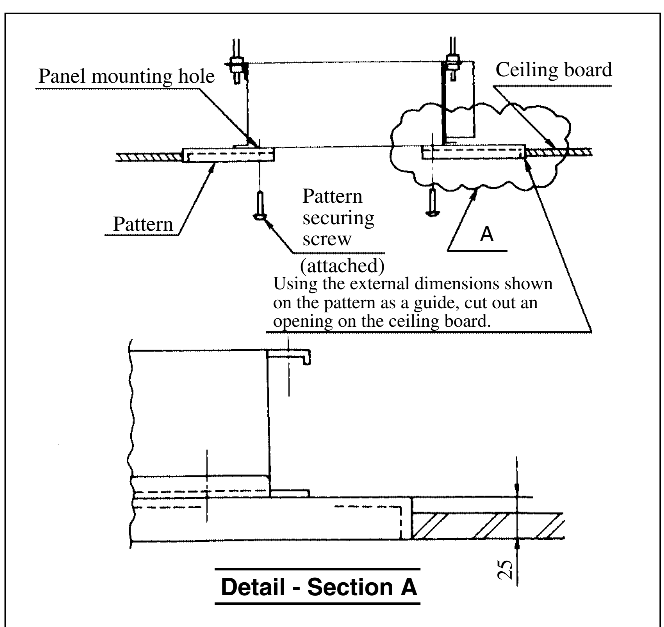
d) Installation



Procedures

① Install nuts on the Suspension bolts at onside. Suspension the suspension fixtures on the Suspension bolts first and then insert the remaining fixtures on the remaining Suspension bolts at and lock them with nuts.

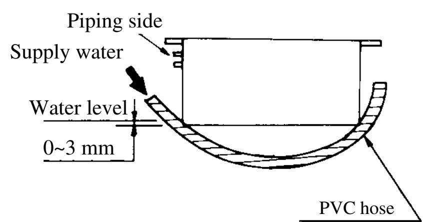
② Since the indoor unit and the panel height cannot be adjusted, adjust the height using an attached pattern before fixing the indoor unit.



Check of levelness

Check the levelness as follows. Use a level gauge or adjust the levelness with the following method.

- Adjust the bottom of indoor unit and the water level as shown below.

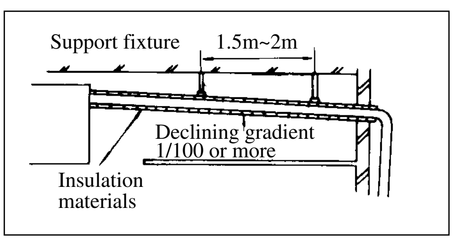


Slightly lower the piping side

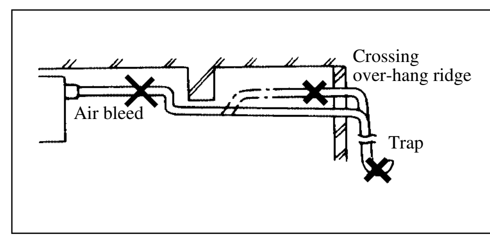
2) Drain pipe

a) Set the drain pipe as a declining gradient (1/50 ~ 1/100) and avoid to cross an over-hand ridge or to allow a trap on the way.

● Good piping

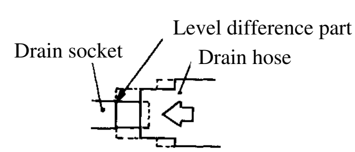


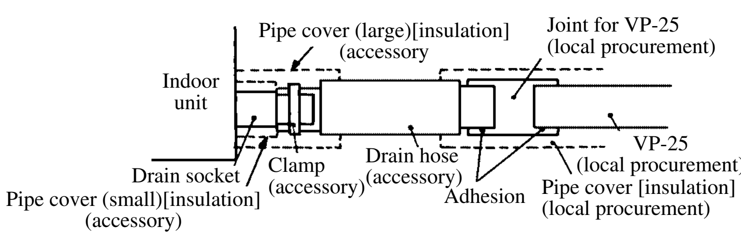
● Improper piping



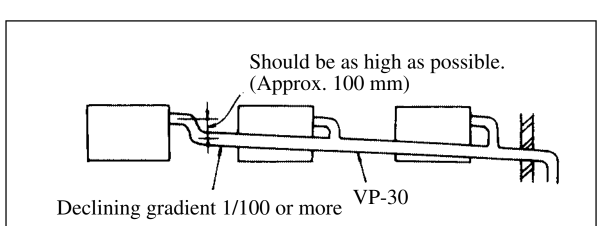
b) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

c) For drain pipe, use hard PVC ganeral purpose pipe VP-25 (I.D.1") which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securly using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).





d) When there are plural number of drain pipes, arrange to position the converging pipe at about 100mm below the drain outlet as shown below. Use a pipe of VP-30 or higher for the converging pipe.

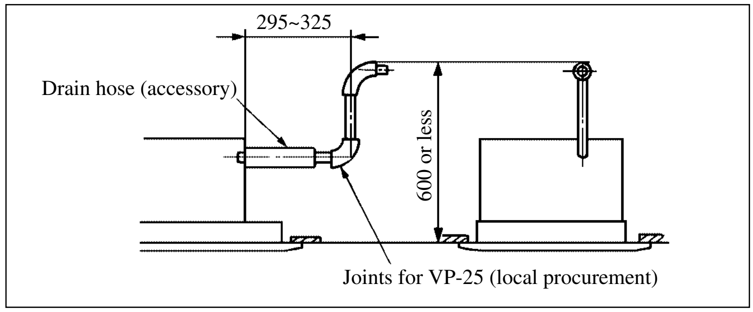


e) Make sure to provide the thermal insulation for the hard vinyl chloride pipe and drain socket provided indoor.

f) Air bleed should not be provided in any event.

- When it is necessary to raise the drain head, the limitation is up to 600mm below the bottom face of ceiling where the unit is installed. The distance is the dimension of the pipe which is installed perpendicularly from a point close to the output for drain pipe connection.

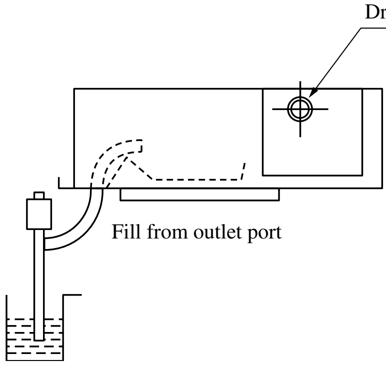
Unit : mm

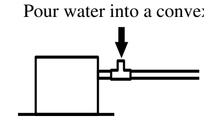


Drain test

[Perform this before installing the ornament panel]

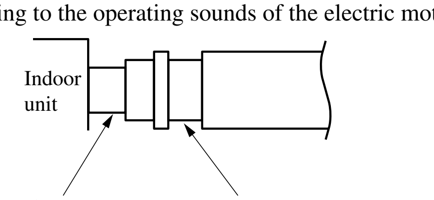
- Perform this upon completion of electrical work.
- Gradually introduce 2,000~3,000cc of water as shown below.





(If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet. Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.)

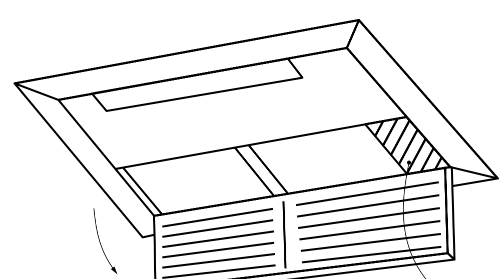
- Connect the remote control switch and set to cooling operation. The drain pump will operate with the compressor on.
- Test whether or not the water is draining while listening to the operating sounds of the electric motor for the drain water.



- Check that water is draining smoothly and that there is no water dripping from the connections or other areas.

Forced drain pump operation

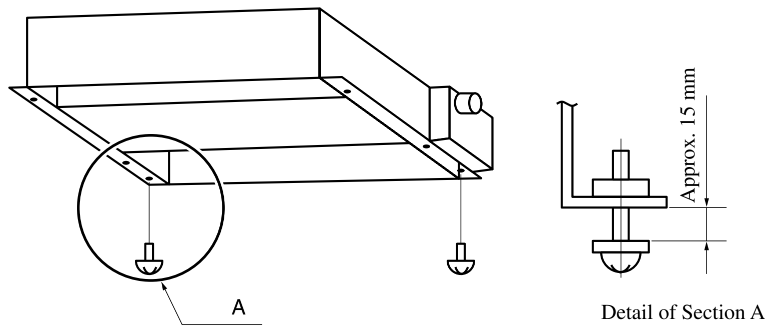
- Turn on dip switch (SW5-3) on the PCB of the indoor unit. The drain pump operates continuously.
- After the test, be sure to turn off the dip switch.
  (If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)



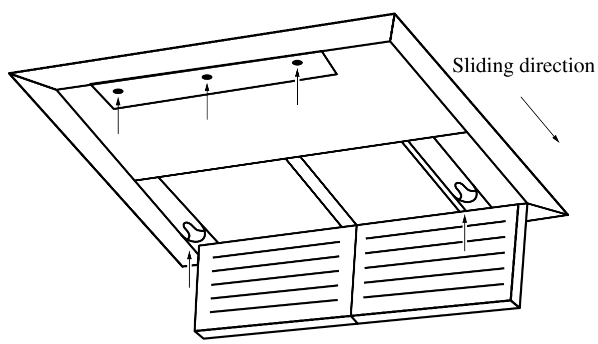
Mounting the Panel

① Open the inlet grille and remove the air block panel from the inside. (Remove the 2 screws.)

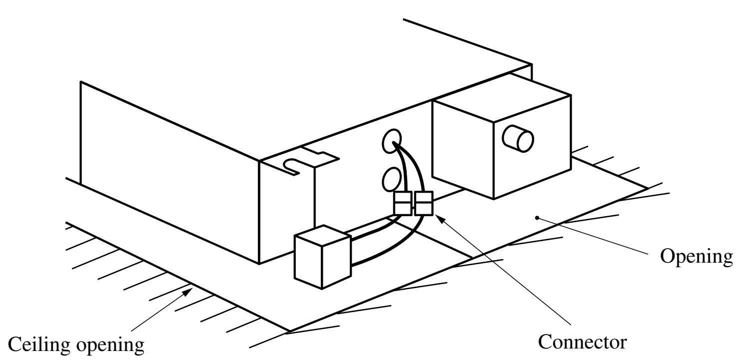
② Mount the two (M5 x 35) panel mounting screws to the indoor unit



③ Hang the panel on the two mounting screws on the indoor unit by using the two shaped holes. Slide the panel approximately 10 mm. Use the 5 panel mounting screws to secure the panel.



④ Use the opening to connect the connectors for the louver motor and limit switches.



⑤ Reinstall the wind shield plate.

(c) Installation on higher ceiling

Adhere the insulation materials on the blow outlet of the indoor unit. All others are same as the standard installation.

(5) **Cassetteria type (FDR)**

(a) **Preparation of indoor unit**

Before of during the installation of the unit, assemble necessary optional panel, etc. depending on the specific type.

(b) **Select places for installation satisfying following conditions and, at the same time, obtain the consent on the part of your client user.**

1) Places where chilled or heated air circulates freely.
   When the installation height exceeds 3 m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.
2) Places where perfect drainage can be prepared and sufficient drainage.
3) Places free from air disturbances to the suction port and blowout hole of the indoor unit, places where the fire alarm may not malfunction or short-circuit.
4) Places with the environmental dew-point temperature is lower that 28°C and the relative humidity is less than 80%.
   (When installing at a place under a high humidity environment, pay sufficient attention the prevention of dewing such as thermal insulation of the unit prperly.)

(c) **Avoid installation and use at those place listed below.**

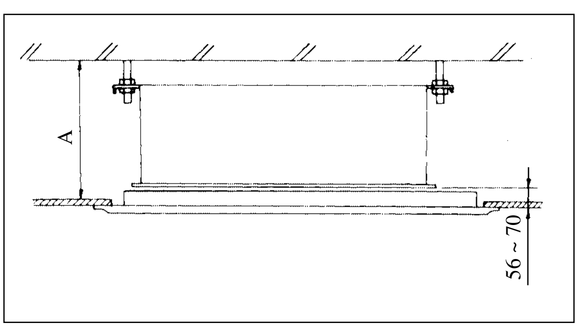
1) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
   Installation and use at such places incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic vesin parts.
2) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc) in generated or remains.
   Installation and use at such places cause corrosion in the heat exchanger and damage in molded synthetic resin parts.
3) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals.
   Generated noise may cause malfunctioning of the controller.

(d) **Preparation for installation**

1) Selection of suspension pattern

When the unit is hanged from ceiling, select one of following patterns depending on the dimensions of the ceiling.

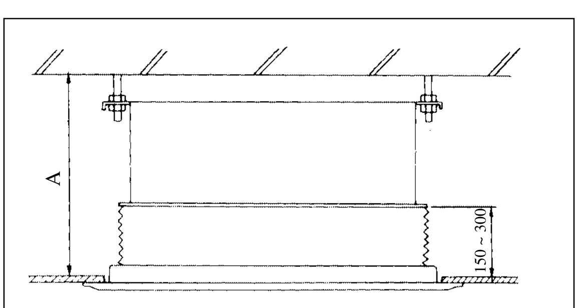
< Combination with silent panel >



Unit : mm

Models \ Mark	A
FDR45, 56, 71, 90	365 or more
FDR112, 140	416 or more

< Combination with canvas panel >



Unit : mm

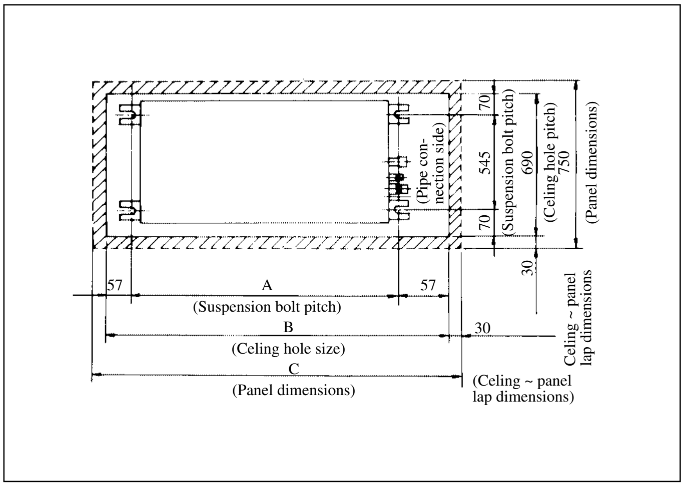
Models \ Mark	A
FDR45, 56, 71, 90	495 or more
FDR112, 140	510 or more

2) Ceiling hole size and position of suspersion bolt

When boring at the ceiling, use the pattern sheet included in the accessory of the unit.

Leave the pattern sheet on the unit till decorative panel is installed.

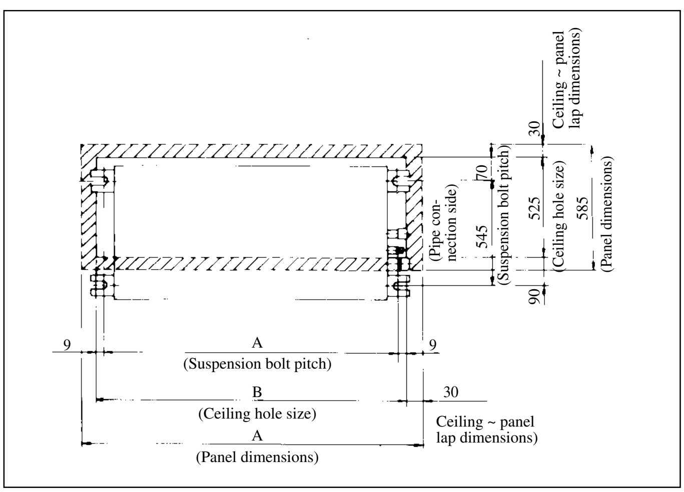
< Combination with silent panel >



Unit : mm

Models \ Mark	A	B	C
FDR45, 56	786	980	1040
FDR71, 80	986	1180	1240
FDR112, 140	1406	1600	1660

< Combination with canvas panel >



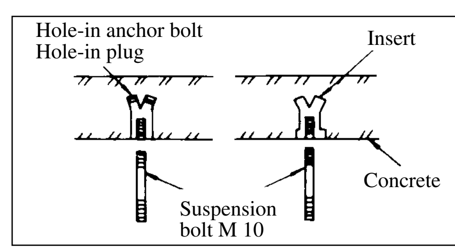
Unit : mm

Models \ Mark	A	B	C
FDR45, 56	786	804	864
FDR71, 80	986	1004	1064
FDR112, 140	1406	1424	1484

3) Suspension bolts installation

- Locate the suspension bolts position by using the pattern sheet

  (Use care of the piping direction when the unit is installed)

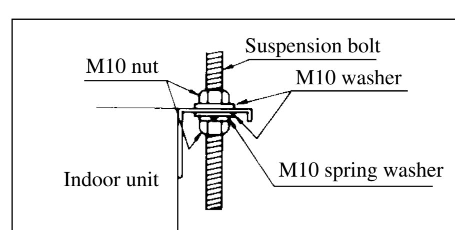


(e) Installation of indoor unit

1) Fix the indoor unit to the suspension bolts.

   If required, it is possible to suspend the unit to the beam, etc.

   Directly by use of the bolts without using the suspension bolts.

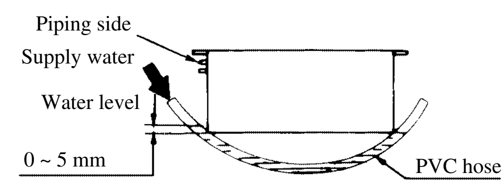


Note (1) When the dimensions of indoor unit and ceiling holes does not match, it can be adjusted with the slot holes of mounting bracket.

2) Adjusting the unit's levelness

① Adjust the out-of levelness using a level vial or by following method.

- Make adjustment so that the relation between the lower surface of the indoor unit proper and water level in the hose becomes as given below.

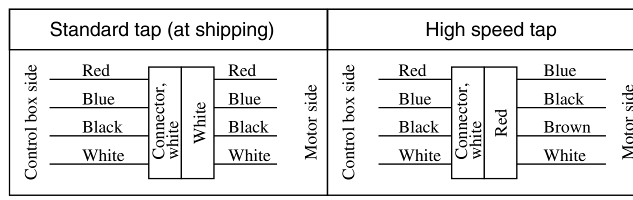


Bring the piping side slightly lower.

② Unless the adjustment to the levelness is made properly, malfunctioning or failure of the float switch may occur.

3) Tap selection on blower unit

Taps of blower unit are set at the standard selection at the shipping from factory. Where the static pressure is raised by changing the connection of connectors provided at the flank of control box as shown below.



(f) Installation of decorative panel

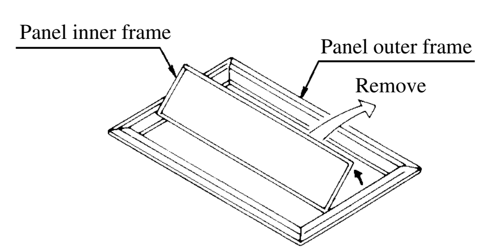
1) Case of silent panel

a) Accessory

Name	Q'ty	Position
Round head machine screw (M5 x 35)	4 pcs.	Securing the panel

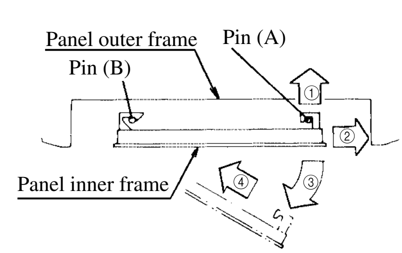
b) Installation procedures

① Remove the inner frame of panel

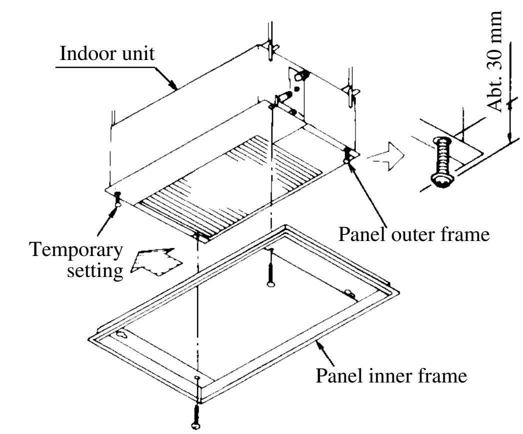


< How to remove the panel inner frame >

- Detach from pins (A) in the order of arrow ① → ②
- Open slightly as the arrow ③ and move toward the arrow ④ and detach from pin (B)



② **Install the panel outer frame on the Indoor unit.**



Procedures of installation

① Secure the panel tentatively with 2 of 4 panel set screws (panel accessory) as shown above.

② When the panel is supported with a pair of set screws, slide it in the arrow direction.

Note (1) Panel outer frame has the orientation.

③ Lock the former 2 and remaining 2 set screws.

④ Install the panel inner frame in the reverse order of removal.

2) Case of canvas panel

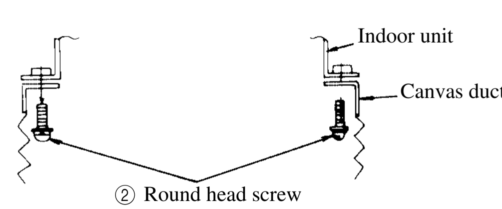
(Canvas duct (option) is necessary to install the canvas panel.)

a) Accessory

Symbol	Name	Q' ty	Position
①	Round head machine screw (M4 x 16)	4	Panel securing
②	Round head machine screw (M5 x 16)	8	Canvas duct securing
③	Round head machine screw (M5 x 25)	4	Chain securing
④	Holder	4	
⑤	Chain	4	

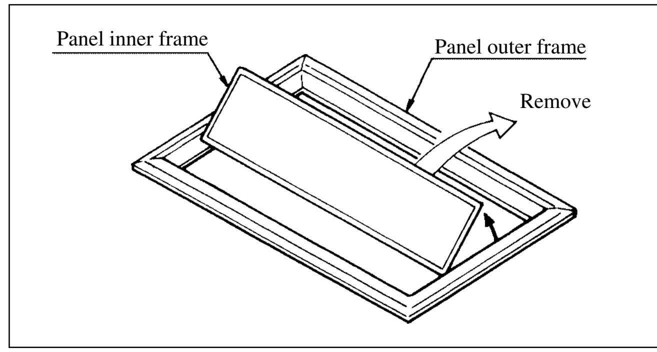
b) Mounting procedures

① **Install the canvas duct (option, 4 places) on the Indoor unit.**

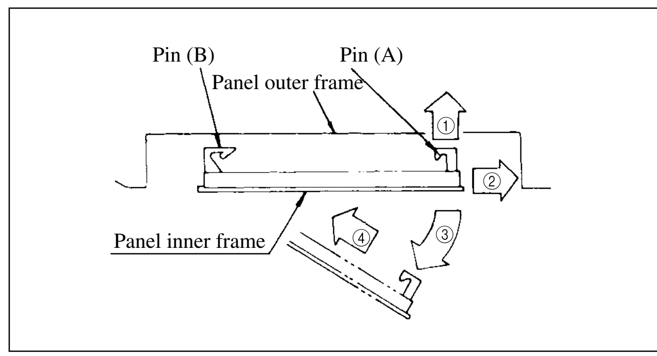


② **Remove the panel inner frame.**

It can be removed same as the silent panel.

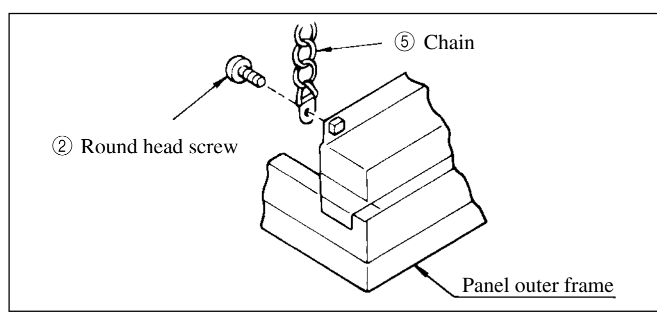


< How to remove the panel inner frame >



- Detach from pins (A) in the order of arrow ① → ②
- Open slightly as shown by the arrow ③. move in the ④ arrow direction and detach from pin (B).

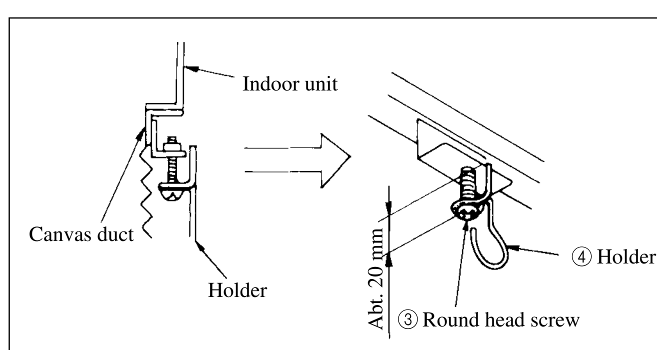
③ **Install the chains on the panel outer frame. (4 places)**



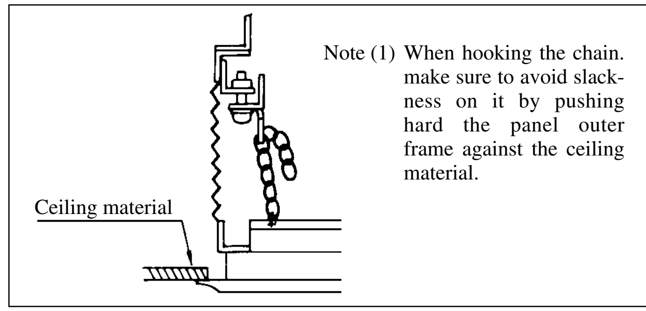
④ **Install the panel outer frame.**

Procedures of installation

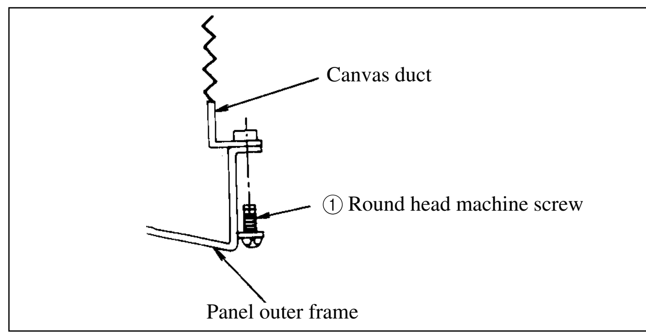
- Secure the holder tentatively as shown below. (4 places)



- Hook the chain of panel outer panel on the holder.

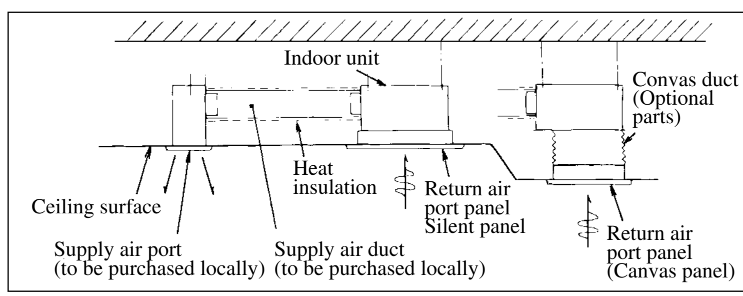


- Tighten ③ screw in the step ① till the panel outer frame contacts closely with the ceiling material.
- Secure the canvas duct and the panel outer frame with screws.



⑤ Remove the panel inner frame and install in the reverse order of removal.

⑥ Cautions for duct installation work



Calculate the draft and external static pressure and select the length, shape and blowout.

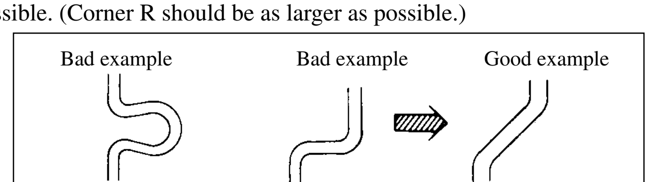
◆ Supply air duct

- 1-spot, 2-spot, 3-spot and 4-spot with ∅200 type duct are the standard specifications. Determine the number of spots based on following table.

FDR45, 56	FDR71, 90	FDR112, 140
2-spot	2 ~ 3-spot (1)	3 ~ 4-spot (1)

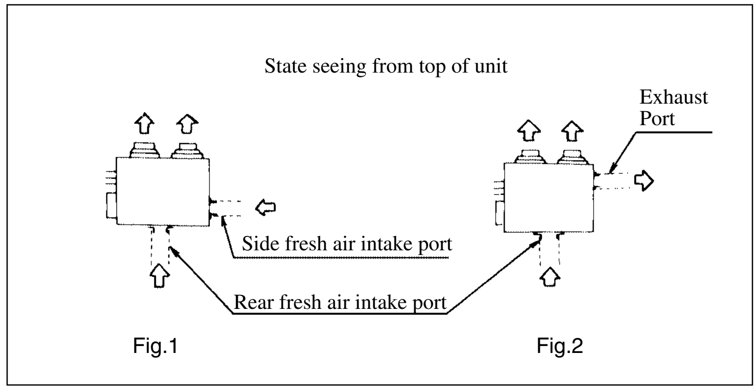
Notes (1) Shield the central supply air port for 2-spot.
(2) Shield the supply air port around the center for 3-spot.

- Limit the difference in length between spots at less than 2:1.
- Reduce the length of duct as much as possible.
- Reduce the number of bends as much as possible. (Corner R should be as larger as possible.)



- Use a band, etc. to connect the indoor unit and the supply air duct flange.
- Conduct the duct installation work before finshing the ceiling.

(g) Connection of air inteke and exhaust ducts.



1) Duct connecting position

a) Fresh air intake

- Inlet can be selected from the side or rear faces depending on the working conditions.
- Use the rear fresh air inlte when the simultaneous intake and exhaust is conducted. (Side inlet cannot be used.)

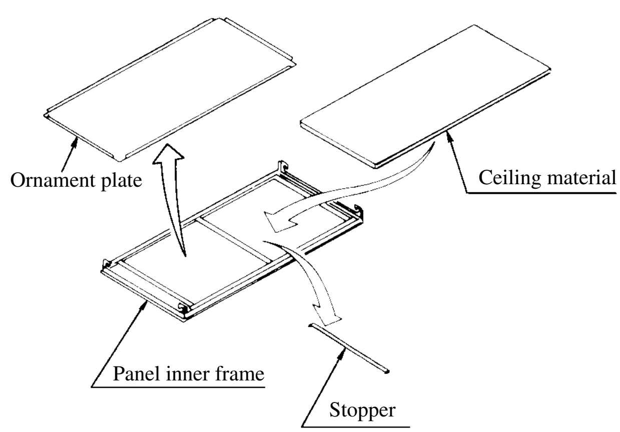
b) Exhaust (Make sure to use also the air intake.)

Use the side exhaust port.

Attachment of ceiling material

Ceiling material can be attached to the panel innern frame.

(Plate thickness max. 15mm)



Attachment procedures

① Remove the stopper.

② Remove the ornament plate and attach the ceiling material.

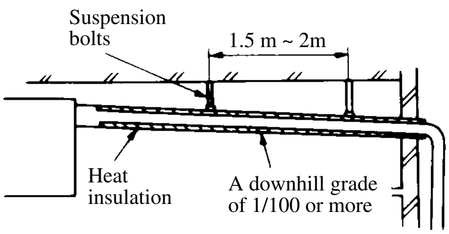
③ Hold down the ceiling material and return the stopper in position.

Note (1) If the ceiling material is attached, the ornament plate is not used.

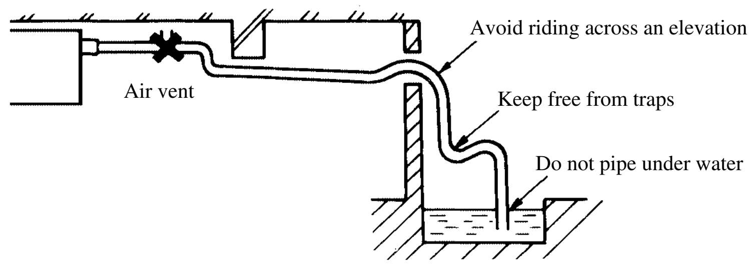
(h) Drain piping

1) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or making traps.

●Good piping

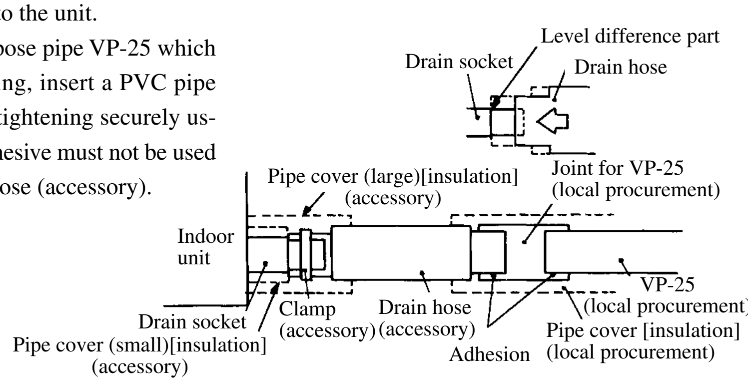


● Improper piping

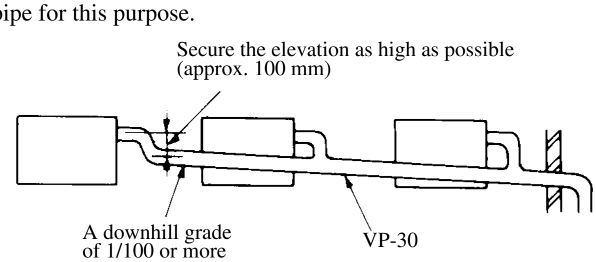


2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as possible to the unit.

3) For drain pipe, use hard PVC general purpose pipe VP-25 which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).



4) When constructing drain piping for several units, position the common pipe about 100mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicker pipe for this purpose.

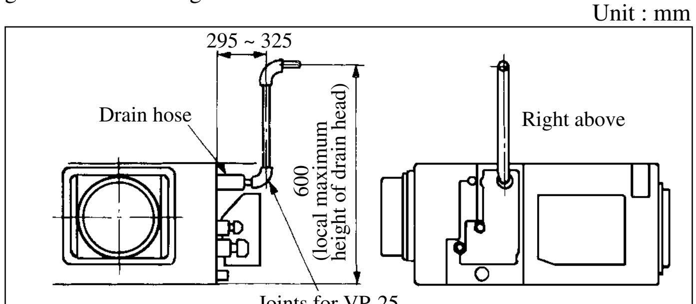


5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

6) Do not ever provide an vent.

7) The height of the drain head may be elevated up to a point 600mm from the bottom of unit and when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-flow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therefore, make the height of the drain pipe withing the distance given in the drawing below.

Unit : mm



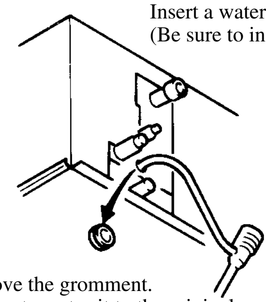
8) Avoid positioning the drain piping outlet at a place where ganeration of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may ganerate.

9) Drainage test

a) During trial operation, make sure that drainage is properly execued and check that leakage is not found at connections.

b) Be sure to carry out a drainage test when installing the system during a heating season.

c) When installing the system in a building under construction, carry out the drainage test before ceiling tiles are installed.



① Supply approx 1000cc of water through the outlet of the unit using a feed water pump.

② Make sure that drainage is proceeding properly at the see-through outlet of the unit.

*Also confirm the revolving sound of the condensate motor when checking the drainage.

③ Then remove the drain plug at lower section of the unit to drain water off. After making sure water is not left, restore the drain plug to the original position.

Forced drain pump operation

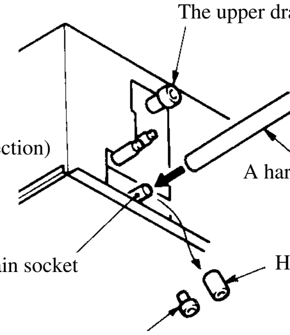
① Turn on dip switch 5-3 on the PCB of the indoor unit. The drain pump operates continuously.

② After the test, be sure to turn off the dip switch.

(If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)

10) Drainage from the lower drain socket

Only if the drain pipe can be installed in a downhill grade (1/50-1/100), the lower drain socket can be used for connecting to the drain pipe as illustrated.

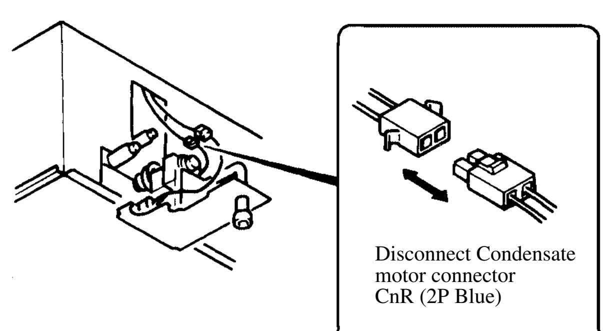


(Disconnect the connector for the drain motor)

As shown in the sketch to the ri-ght, disconnect the drain motor connector CnR (blue color codi-ng).

Caution:

If the system is started with this connector connected as is, drain water is discharged out of the upper drain socket causing a heavy water lekage.



(6) Medium static pressure ducted type (FDQM)
Model FDQMJ36HKXE3

(a) Selection of installation location

1) Avoid installation and use at those places listed below.

a) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

b) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is gnerated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

c) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals. Generated noise may cause malfunctioning of the controller.

2) Select places for installation satisfying the following conditions and, at the same time, obtain the consent on the part of your client user,.

a) Places where chilled or heated air circulates freely. When the installation height exceeds 3m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.

b) Places where perfect drainage can be prepared and sufficient drainage gradient is available.

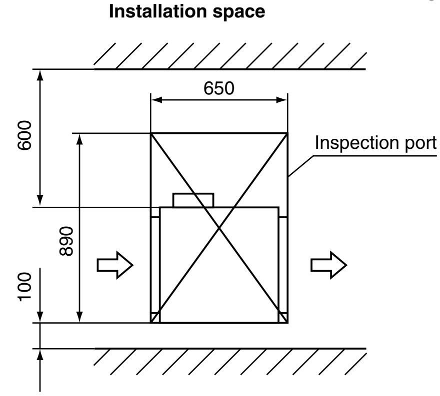
c) Places free from air disturbances to the return air port and supply hole of the indoor unit, places where the fire alarm may not malfunction to short circuit.

d) Places with the environmental dew-point temperature is lower than 28˚C and the relative humidity is less than 80%.
(When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)

3) Check if the selected place for installation is rigid enough to stand the weight of thew unit.
Otherwise, apply reinforcement using boards and beams before starting the installation work.

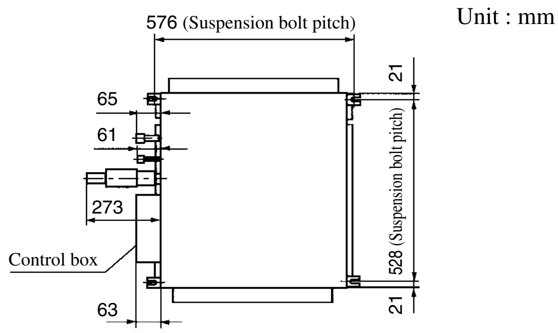
Unit : mm

Installation space

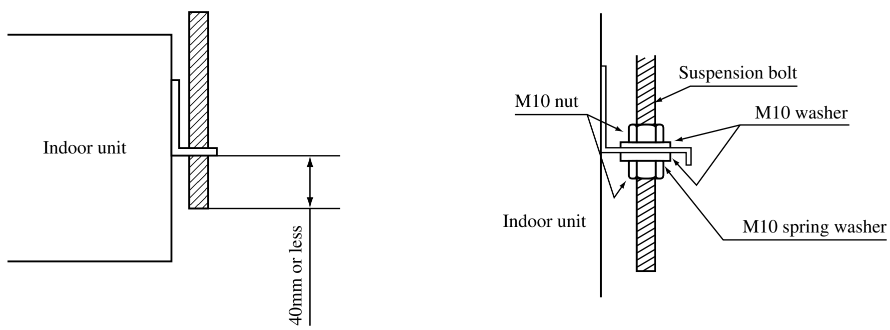


(b) Suspension the Unit

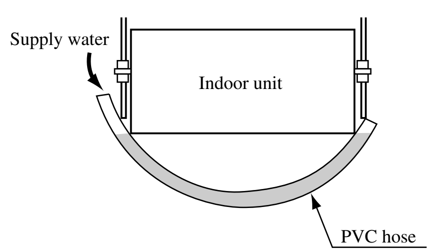
Use four (4) M10 or W3/8 suspension bolts. Secure them firmly so that each can withstand a pull-out load of 50 kg/f.



1) Adjust suspension bolts length to the following dimension.

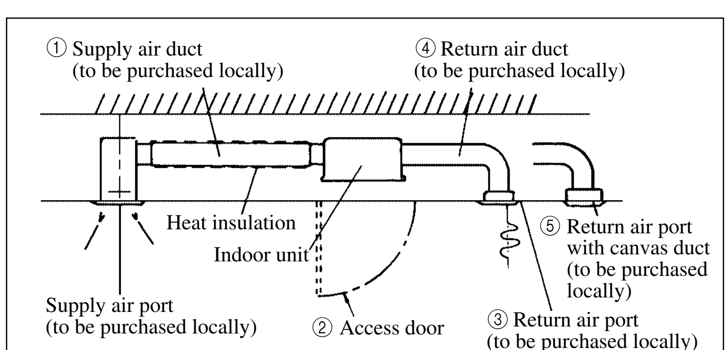


2) Set the suspension bolts (to be prepared at job site) in place.
3) Level the unit using a level or a hose filled with water. If the unit is out of level, water leaks or malfunctioning of the floating switch may occur.

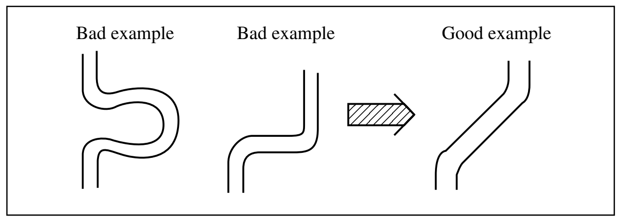


4) After ensuring the above, secure the unit.

(c) Duct installation



1) Calculate air capacity and the outside static pressure to select the duct’s length and shape, and blow outlet.
Caution
Take care that the outside atatic pressure does not exceed 30 Pa. The unit has condensation owing to the decrease in air capacity, possibly causing the ceiling and household goods to become wet.
2) The indoor unit is not provided with an air filter. Assemble it into the suction grill for which cleaning is easy.
3) Make the duct the shortest in length.

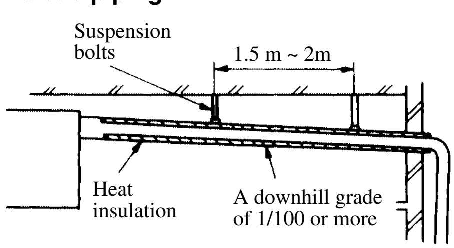


4) Bend a lot less abruptly. (Make the bend radius a lot larger.)
5) When connecting the indoor unit to the duct flange of the blow outlet, attach the insulation material to the fixed portion to protect it from condensation.
6) Conduct the duct work before ceiling attachment.
7) Make sure to keep the suction duct warm to protect it from condensation.
8) Install the blowout hole where air can flow all over the room.
9) Make sure to install the inspection opening in the ceiling. It is needed for the maintenance of electrical parts, the motor and other parts.

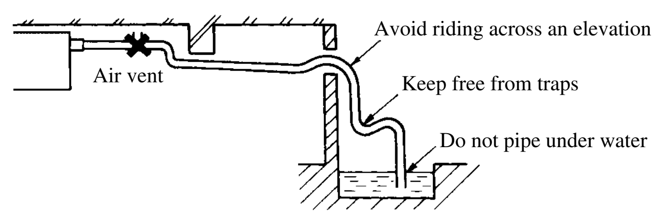
(d) Drain piping

1) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or makeing traps.

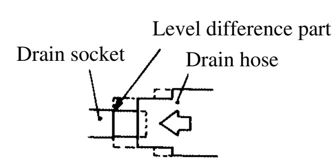
● Good piping

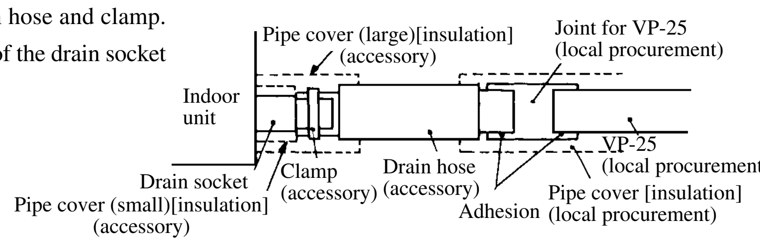


● Improper piping

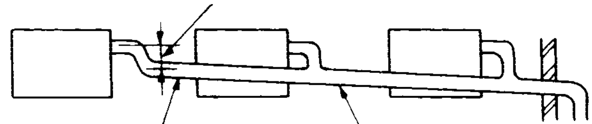


2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.
3) For drain pipe, use hard PVC general purpose pipe VP-25 which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).





4) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicher pipe for this purpose.

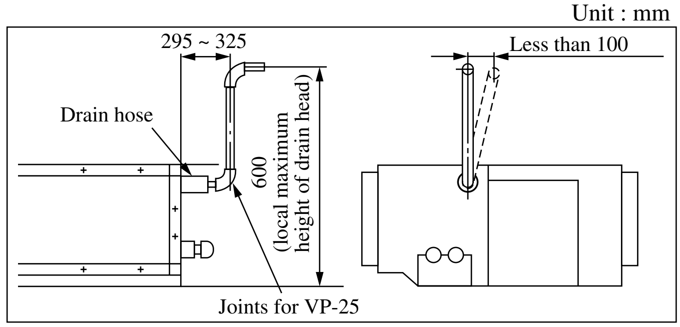


5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

6) Do not ever provide an air vent.

7) The height of the drain head may be elevated up to a point 600 mm from the bottom of unit and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-flow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therfore, make the height of the drain pipe withing the distance given in the drawing below.

Unit : mm



8) Avoid positioning the drain piping outlet at a place where generation of odor may stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

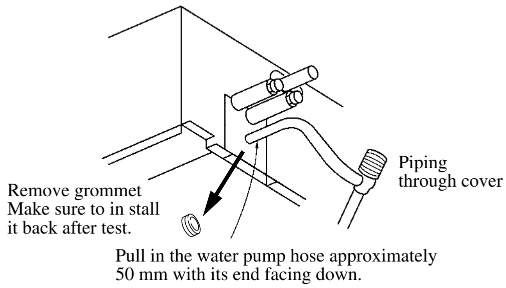
(e) Drain test (Perform the drain test after the electrical wiring work has been finished.)

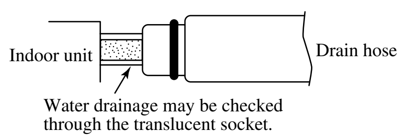
- Check that water is draining thoroughly during the test run, and that there are no water leaks from the joints.
- The test has to be performed even if the unit is installed in a season when the unit is used for heating.
- In a new house, perform the test before the ceiling is fitted.

Forced drain pump operation

- Turn on dip switch (SW5-3) on the PCB of the indoor unit. The drain pump operates continuously.
- After the test, be sure to turn off the dip switch.

(If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)





1) Remove the piping through cover, and using a water pump, pour about 1000cc of water, from the position shown in the left figure.
   Caution
   When pour water, be sure to perform the drain pump forced operation.
2) Check the drain-out section (transparent section) for normal flow of drainage.
3) Take off the drain plug to release the water. After water release has been confirmed, replace the drain plug as it was.
   ※ Be careful not to get splashed when pulling the drain plug.
4) After the drain test, thoroughly insulate the drain pipe, up to the main unit.

(7) Satellite ducted type (FDUM)

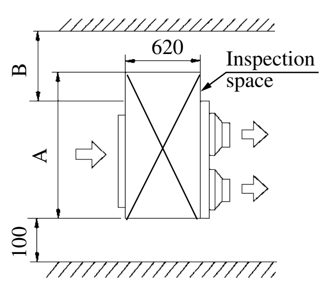
Models FDUMJ36, 45, 56, 71, 90, 112, 140HKXE2

(a) Selection of installation location

1) Avoid installation and use at those places listed below.
   a) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
      Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.
   b) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is gnerated or remains. Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.
   c) Places adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals. Generated noise may cause malfunctioning of the controller.

2) Select places for installation satisfying the following conditions and, at the same time, obtain the consent on the part of your client user,.
   a) Places where chilled or heated air circulates freely. When the installation height exceeds 3m, warmed air stays close to the ceiling. In such cases, suggest your client users to install air circulators.
   b) Places where perfect drainage can be prepared and sufficient drainage gradient is available.
   c) Places free from air disturbances to the return air port and supply hole of the indoor unit, places where the fire alarm may not malfunction to short circuit.
   d) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%.
      (When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)

3) Check if the selected place for installation is rigid enough to stand the weight of thew unit.
   Otherwise, apply reinforcement using boards and beams before starting the installation work.



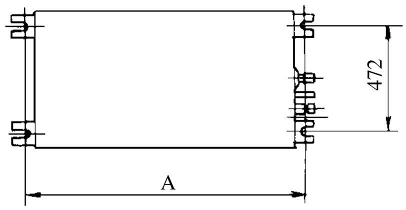
Unit : mm

Mark / Models	A	B
FDUM36, 45, 56	1100	630 (600)
FDUM71, 90	1300	830 (600)
FDUM112, 140	1720	1250 (600)

Note(1) In case that dimension shown in parenthesis ( ) is applied, it is impossible to service the humidifier from the side face. Service the humidifier only from the under side.

(b) Suspension

Be sure to observe the finished length of the suspension bolts given below.

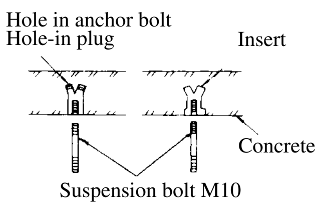


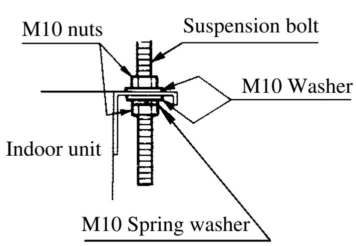
Unit : mm

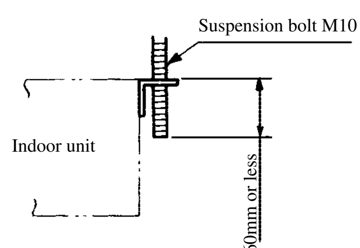
Models \ Mark	A
FDUM36, 45, 56	786
FDUM71, 90	986
FDUM112, 140	1406

1) Fixing the suspension bolt (customer ordered parts M10)

Securely fix the suspension bolt as illustrated below or in another way.



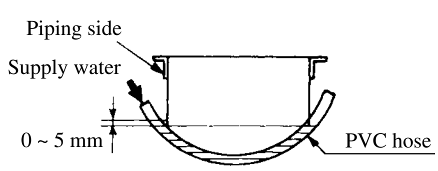




2) Adjusting the unit's levelness

a) Adjust the out-levelness using a level vial or by the following method.

- Make adjustment so that the relation between the lower surface of the indoor unit proper and water level in the hose becomes given below.

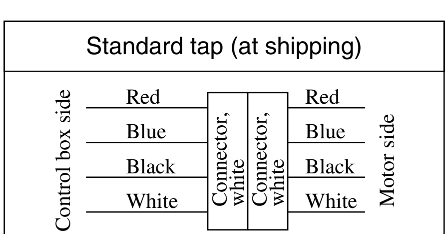


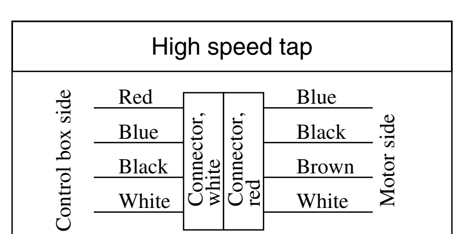
Bring the piping side slightly lower

b) Unless the levelness is adjusted properly, the malfunction of the float switch will occur.

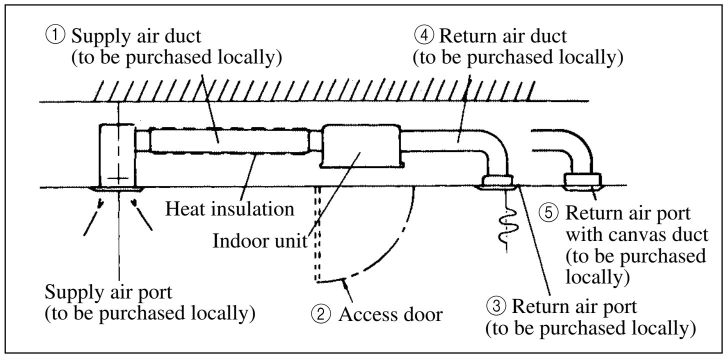
3) Tap selection on blower unit.

Taps of on blower unit are set at the standard selection at the shipping from factory. Where the static pressure is raised by changeing the connection of connectors provided at the flank of control box as shown below.





(c) Duct installation



① Supply air duct

Same as FDR series. Refer to page 191.

② Access door

Access door must be provided without fail.

- **Dimensions of access door and service space**

  (See exterior dimensions in page 94 to 96.)

③ Return air port

An air filter is not included in the indoor unit. Use the return air port with air filter.

④ Return air duct: Use square duct.

⑤ Return air port with canvas duct

1) Connection of intake and exhaust ducts.

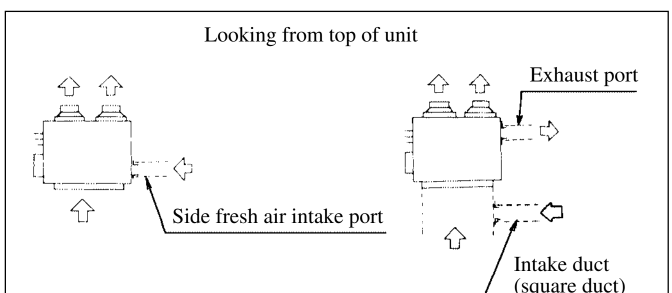


Fig.1 Fig.2

2) Duct connecting position.

< Fresh air intake >

a) Use side air intake port.

b) In case of simultaneous intake and exhaust, the side air intake port cannot be used, therefore, take air from the midway air intake port along the intake duct.

< Exhaust > Make sure to use suction as well.

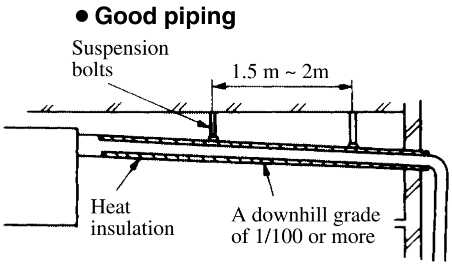
c) Use a side exhaust port.

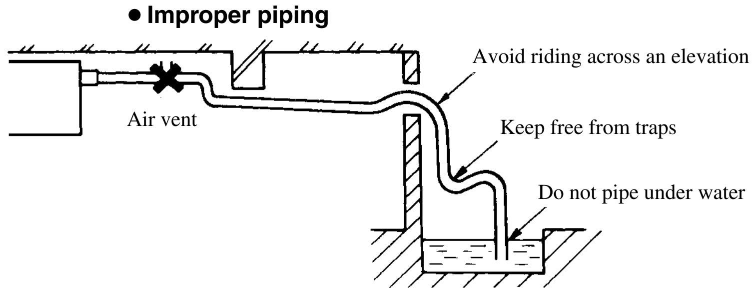
3) Duct connection

Use intake and exhaust duct flange of separately sold (for connection of ∅125mm round duct) to connect ∅125mm round duct. The duct clamped by bands must be thermally insulated to prevent dew condensation.

(d) Drain piping

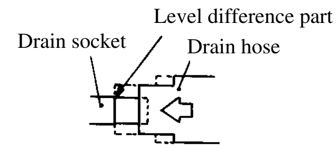
1) Drain piping should always be in a downhill grade (1/50-1/100) and avoid riding across an elevation or makeing traps.

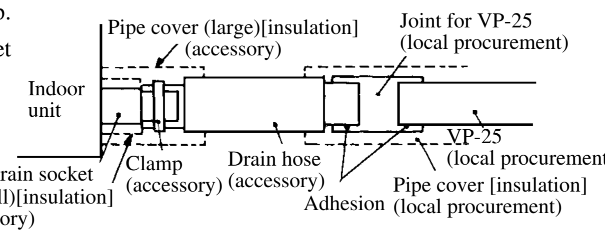




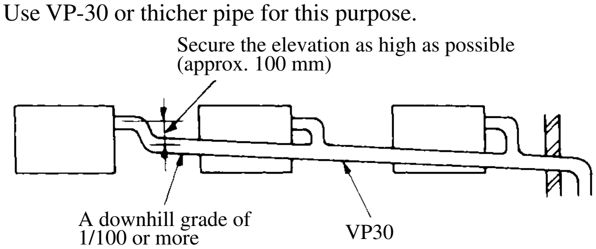
2) When connecting the drain pipe to the unit, pay suffcient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

3) For drain pipe, use hard PVC general purpose pipe VP-25 which can be purchased locally. When connecting, insert a PVC pipe end securely into the drain socket before tightening securely using the attached drain hose and clamp. Adhesive must not be used connection of the drain socket and drain hose (accessory).





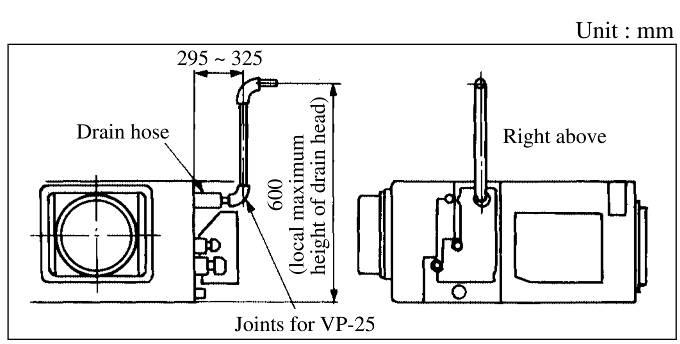
4) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch below. Use VP-30 or thicher pipe for this purpose.



5) Be sure to provide heat insulation to hard PVC pipes of indoor placement.

6) Do not ever provide an air vent.

7) The height of the drain head may be elevated up to a point 600 mm from the bottom of unit and, when an obstacle exists in the ceiling space, elevate the piping to avoid the obstacle using an elbow or corresponding gadget. When doing this, if the stretch for the needed height is too high, the back-flow quantity of drain at the time of interruption of the operation gets too much and it may cause overflow at the drain pan. Therfore, make the height of the drain pipe withing the distance given in the drawing below.



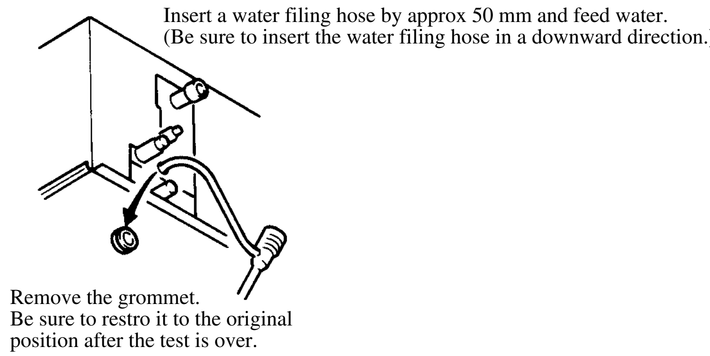
8) Avoid positioning the drain piping outlet at a place where generation of odor may stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

9) Drainage test

a) During trial operation, make sure that drainage is properly execued and check that leakage is not found at connections.

b) Be sure to carry out a drainage test when installing the system during a heating season.

c) When installing the system in a building under construction, carry out the drainage test before ceiling tiles are installed.



① Supply approx 1000cc of water through the outlet of the unit using a feed water pump.

② Make sure that drainage is proceeding properly at the see-through outlet of the unit.

* Also confirm the revolving sound of the condensate motor when checking the drainage.

③ Then remove the drain plug at lower section of the unit to drain water off. After making sure water is not left, restore the drain plug to the original position.

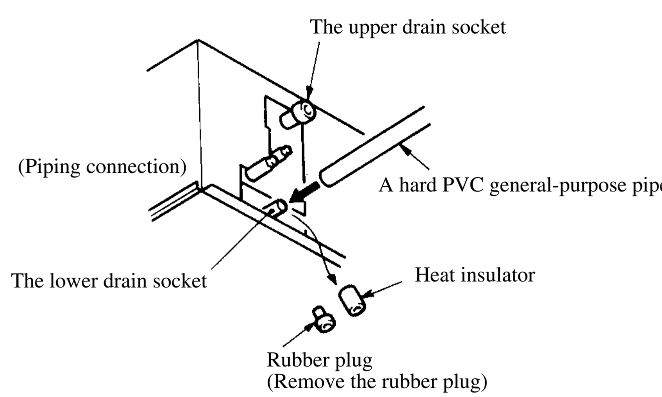
Forced drain pump operation

- Turn on dip switch (SW5-3) on the PCB of the indoor unit. The drain pump operates continuously.
- After the test, be sure to turn off the dip switch.

(If the electrical work has not been completed, connect a convex coupling to the drain pipe to provide a supply port and confirm the draining status of the piping system.)

10) Drainage from the lower drain socket

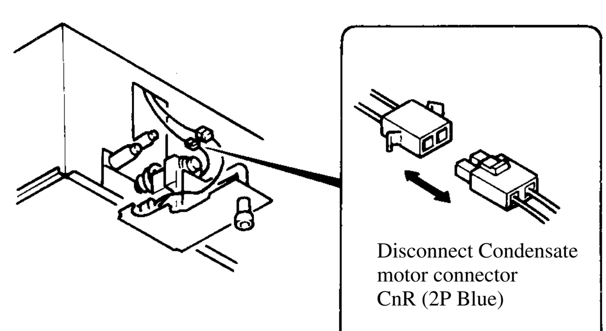
Only if the drain pipe can be installed in a downhill grade (1/50-1/100), the lower drain socket can be used for connecting to the drain pipe as illustrated.



(Disconnect the connector for the drain motor)

As shown in the sketch to the right, disconnect the drain motor con-nector CnR (blue color coding).

If the system is started with this connector connected as is, drain water is discharged out of the upper drain socket causing a heavy water lekage.



(8) Ceiling suspension type (FDE)

(a) Selection of installation location

1) A place where good air circulation and delivery can be obtained.

Cold air throw

Unit : m

Models	FDE36, 45, 56	FDE71	FDE112	FDE140
Air throw	7.5	8	9.5	10

Conditions

(1) Installation height: 2.4 ~ 3.0 m above the floor

(2) Fan speed: Hi

(3) Location: Free space without obstacles

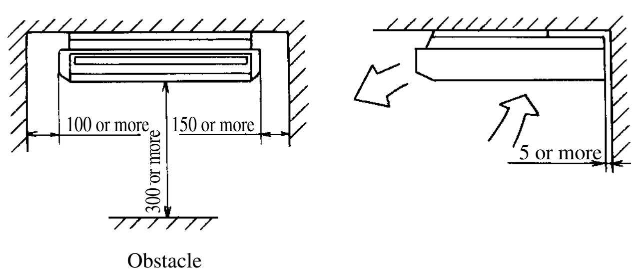
(4) Distance of reach indicates the horizontal distance after the wind touched down the floor.

(5) Air velocity at the throw: 0.5 (m/sec.)

2) A place where ceiling has enough strength to support the unit.
3) A place where there is no obstruction to the return air inlet and supply air outlet ports.
4) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
   Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.
5) A place where the space shown below may be secured.

Ceiling mouting installation

Unit : mm



6) This unit uses a microcomputer as a control device. Therefore avoid installing the unit near the equipment that generates strong electromagnetic waves and noise.

(b) Installation preparation

1) Drilling of holes for interconnecting piping and wiring.

a) Drill a hole through the wall in accordance with the piping diameter. We recommend using a hole saw drill of 70 ~ 86 mm diameter and the hole should be drilled on an incline from inside to outside.

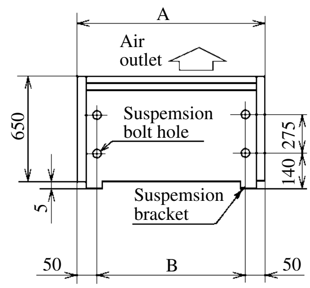
b) Insert the accessory piping sleeve into the hold and cut it to the proper length in accordance with wall thickness.

2) Installation of suspension bolts

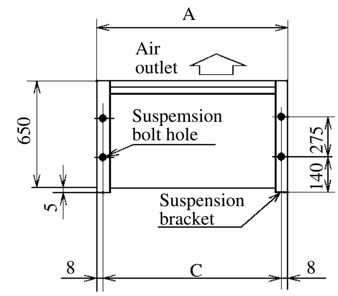
a) Use the template sheet to determine the positions of suspension bolts and refrigerant pipings. The refrigerant piping can be routed either to the right, left, top or rear.

b) Positions of suspension bolts are as in the drawing below.

- **When the suspension brackets face in**



- **When the suspension brackets face out**

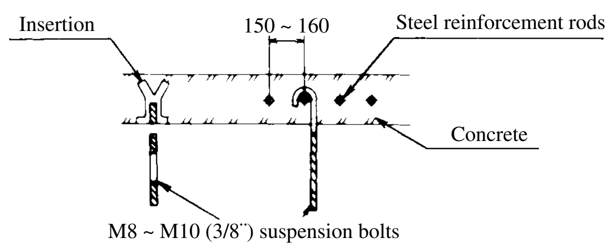


Unit : mm

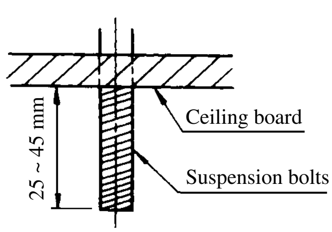
Mark / Models	A	B	C
FDE36, 45, 56	1000	900	984
FDE71, 112	1260	1160	1244
FDE140	1470	1370	1454

c) In case of ferro-concrete buildings

Fix the suspension bolts in the following way.



d) Length of suspension (in cace of exposed type installtion)

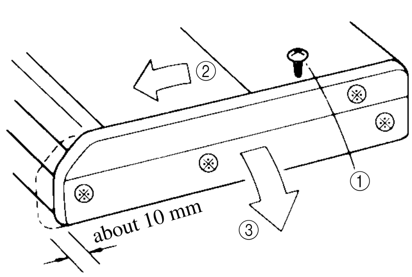


Notes (1) In case the susprnsion bracket face in, and the supension bolts are made to the length as shown in the left drawing the bolts ends will be put in the plasitics cap of the indoor unit top panel.

(2) Don't remove the plastics cap.

(c) Installation of indoor unit

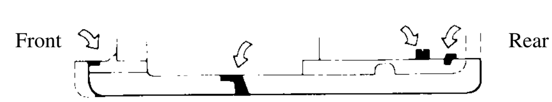
1) Detach the inside panel and suspension bracket



① Remove a fixing bolt of the side panel.

② Unhook four hooks (marked ※) by sliding the side panel in front side about 10mm, and detach the side panel from the unit.

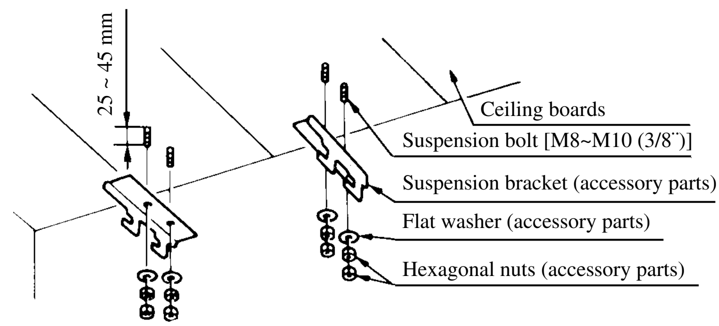
• Position of the hooks



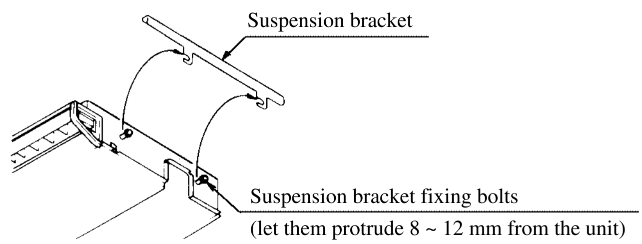
⇦ Slide for front side about 10 mm

2) In case of exposed installation to the ceiling (with suspension brackets facing in)

a) Fix the suspension brackets to suspension bolts

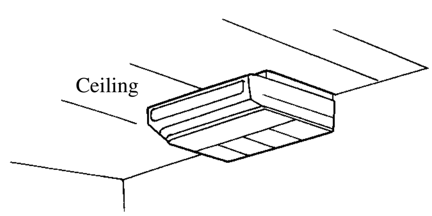


b) Hook the unit to suspension brackers



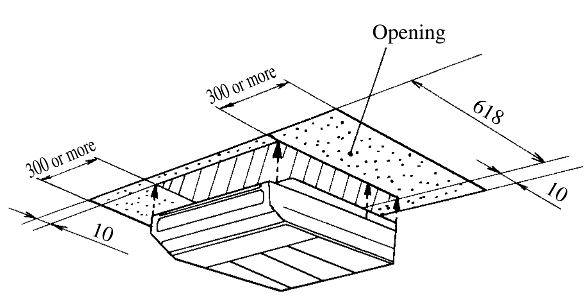
c) Fix unit securely in place by tightening the suspension bracket fixing bolts.

d) Attach the side panels and installation is finished.



3) In case the unit is half recessed into the ceiling (the suspension brackets facing outside)

a) Open a hole in the ceiling large enough for the unit and necessary installation work. (Fill up the excess opening after the installation work is finished.)

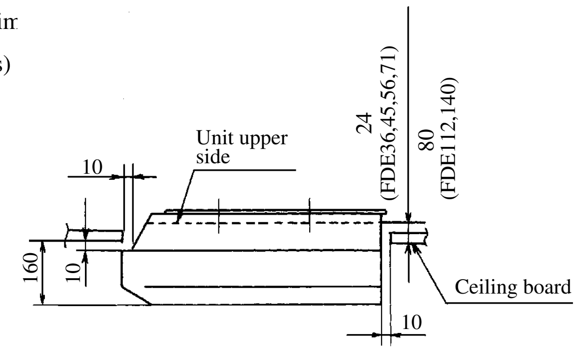


Unit : mm

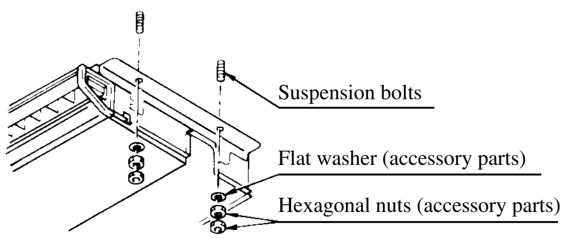
b) Installation space dim

(Plug in dimensions)

Unit: mm

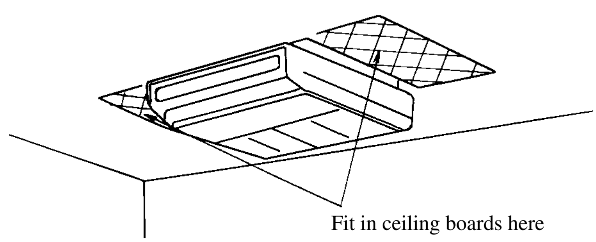


c) Mount the unit using suspension bolts



d) Securely tighten the nuts and fix the indoor unit place.

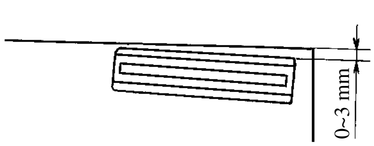
e) Attach the side panels and fit in ceilling board in the space around the unit and the work is finished.



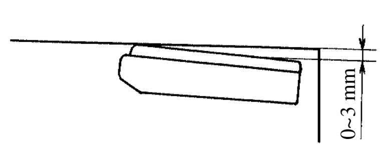
4) Gradient for drainage

Mounting with proper gradient for drainage is needed as shown below.

- **In right and left directions**



- **Front and rear directions**



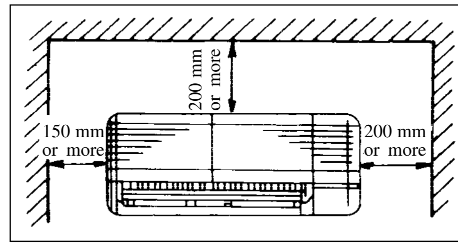
Note (1) In case of left-hand side drainage, the gradient will be to the opposite side.

Caution
- In case of gradient is contrary, water may leak out.
- Indoor side of drain pipe must be thermally insulated.

(9) Wall mounted type (FDK)

(a) Selection of installation location

1) Select the best position and direction depending on the shape of room and height of ceiling to ensure that the cooled or warmed air will be circulated sufficiently.



● **Cold air throw**

Unit : m

Item \ Models	FDK22	FDK28	FDK36, 45	FDK56, 71
Air throw	5	6	7	8

[Conditions]

a) Fan speed: Hi

b) Location: Free space without obstacles

c) Distance of reach indicates the horizontal distance after the wind touched down the floor.

d) Air yelocity at the throw:0.5 (m/sec.)

2) Where there is no obstacle around the air inlet port or air outlet port.

3) Where a sufficient space can be reserved for the service of air filter and the attachment/removal of panels.

4) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such place will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

5) Where pipes and wires can be arranged conveniently.

6) On the solid floor

7) Where the unit is not exposed directly to sun light.

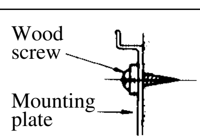
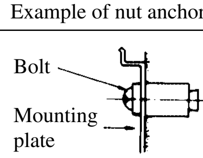
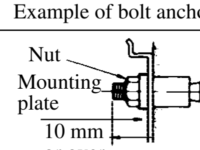
8) Place where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.

9) Where a complete draining can be assured.

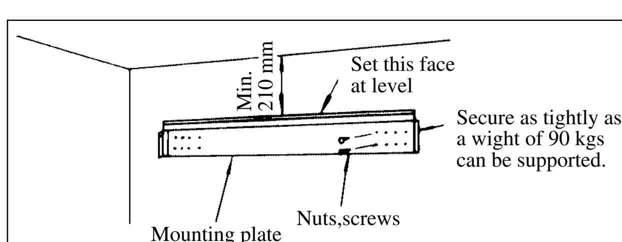
10) Where a sufficient space can be reserved for service.

(b) Method to install the mounting plate

1) Indoor unit weighs about 20 kgs. Be sure to check closely the installation place and, if any risk is expected, provide a sufficient reinforcement with plates or beams. Indoor unit cannot be secured directly on the wall, etc.
Attached mounting plate must be used.

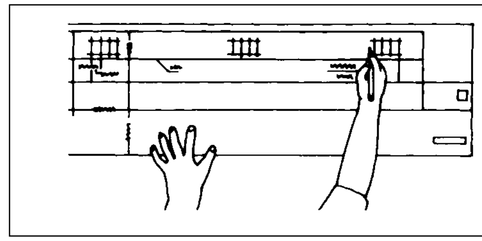
Wooden wall	Concrete wall (Use marketed anchors (M6))	
	Example of nut anchor	Example of bolt anchor
		

2) When installing a mounting plate on the wall, adjust it at level precisely and fix securely. Use the marketed anchor bolts (M6) when the wall is made of concrete.

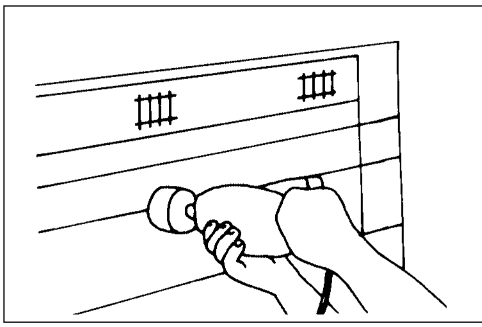


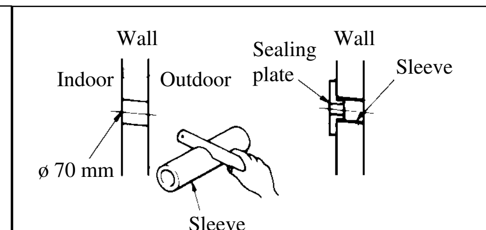
(c) Installation

1) Use an attached pattern sheet and mark the position of screws to attach the mounting plate.



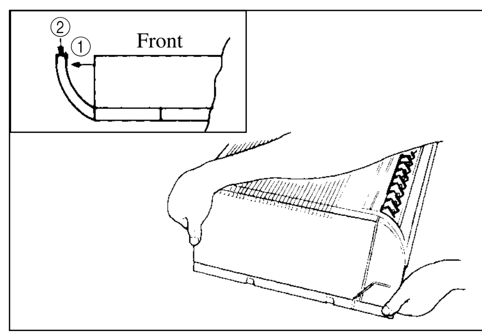
2) Determine the direction to lead the pipe and bore a through hole on the wall aligning with the pipe hole of unit.



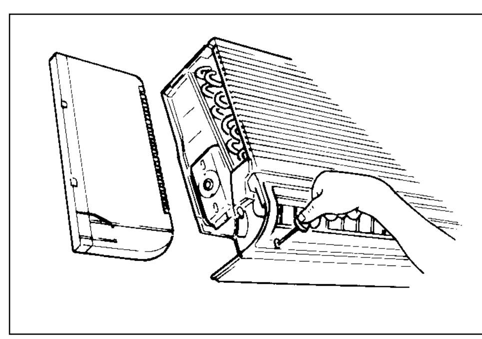


Cut the sleeve for the thickness of wall and insert in the hole.

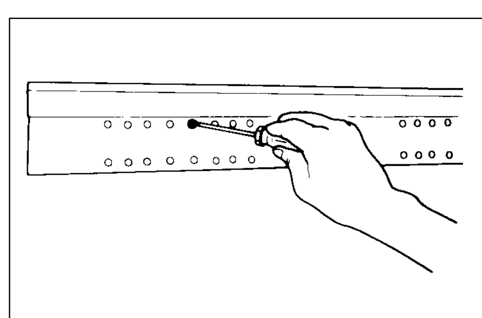
3) Remove screws (2 pcs.) and remove the right and left panels from the Indoor unit. (Remove screws first, move slightl to remove.)



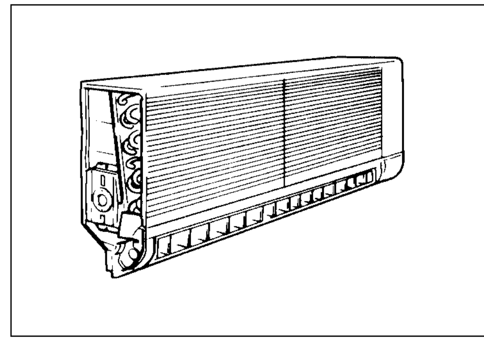
4) Remove the lower panel from the Indoor unit. It can be remove if 3 screws are loosened but not removed.



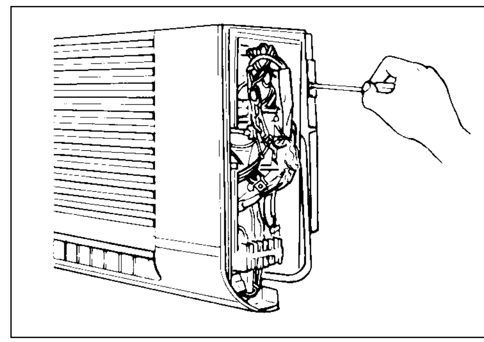
5) Secure the mounting plate with screws at a selected place on the wall. When the wall is made of concrete, use the marketed anchor bolts (M6)



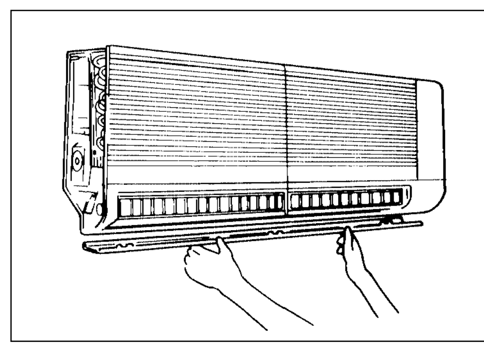
6) Hook and install the indoor unit on the mounting plate from top. Hook slightly at left at first and return to right.



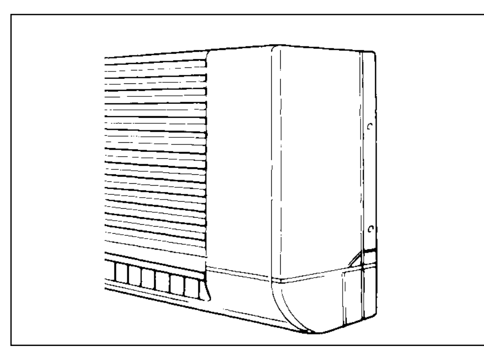
7) Fix the indoor unit on the mounting plate with a screw.



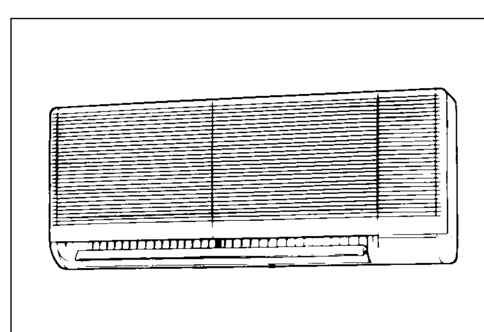
8) Install the lower panel at the original position.



9) Install the right and left side panels at their original position.



10) This is all for the installation.



(10) Floor standing exposed type (FDFL)

(a) Selection of installation location

1) A place where good air circulation and delivery can be obtained.

● Cold air throw

Unit : m

Models	All models
Air throw	**4**

[Conditions]

(1) Fan speed: Hi

(2) Location: Free space without obstacles

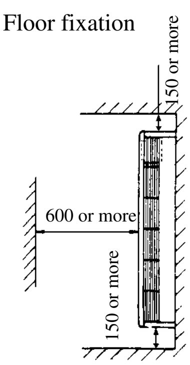
(3) Distance of reach indicates the horizontal distance after the wind touched down the floor.

(4) Air velocity at the throw: 0.5 (m/sec.)

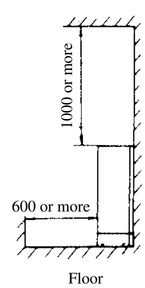
2) Where there is no obstacle around the Air inlet port or Air outlet port.
3) Where a sufficient space can be reserved for the service of air filter and the attachment/removal of panels.
4) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
   Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.
5) Where pipes and wires can be arranged conveniently.
6) On the solid floor
7) Where the unit is not exposed directly to sun light.
8) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
   Installation and use at such place will cause corrosion in the heat exchanger and damage in molded synthtic resin parts.
9) Where a complete draining can be assured.
10) Where a sufficient space can be reserved for service.

Floor standing installation

• Floor fixation



• Wall fixation



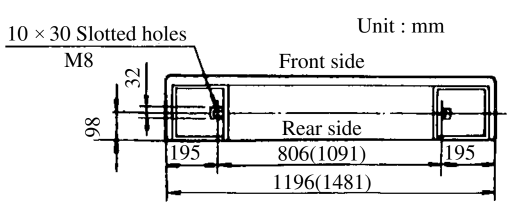
Unit : mm

(b) Bolt positions

1) Bolt positions for metal settings used for floor fixation.

• Metal fitting used for floor fixation (accessories).

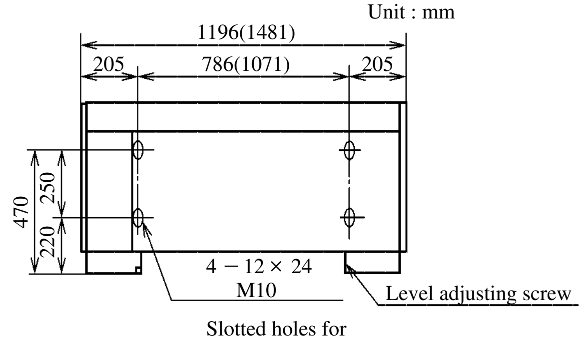
Unit : mm



View from the floor

2) Bolt positions for wall fixation

Unit : mm

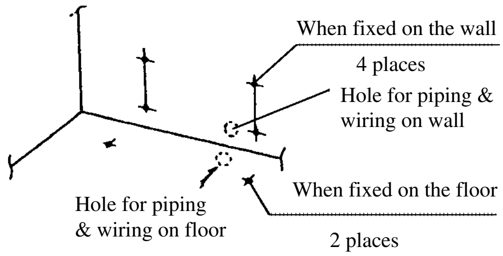


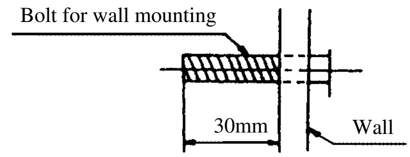
Note (1) Value in ( ) indicates 71 type.

(c) Installation of unit

1) Floor standing installation

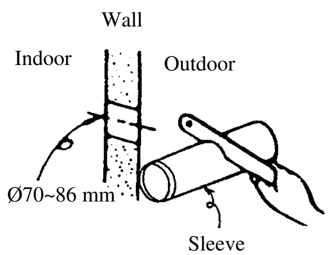
a) Position of mounting bracket fixing bolts Drill holes by referring to figures below.

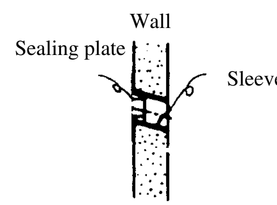




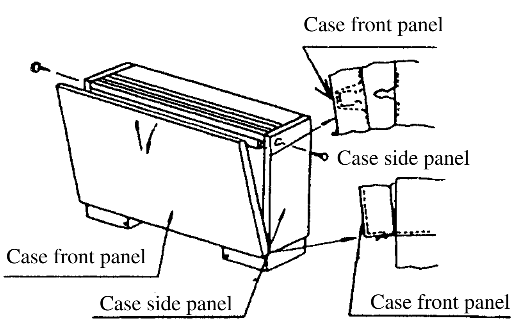
Note (1) Be sure to use a bolt of the length for wall mouning.

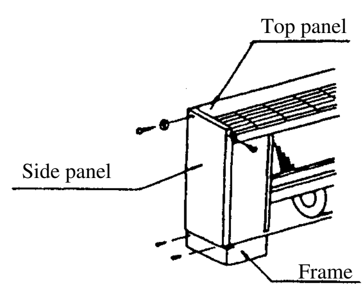
b) The methed of drilling the wall is as follows.





c) Remove the front and side panels.

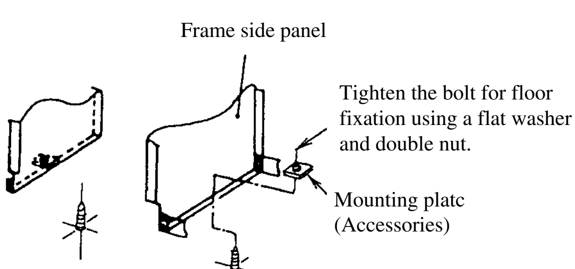




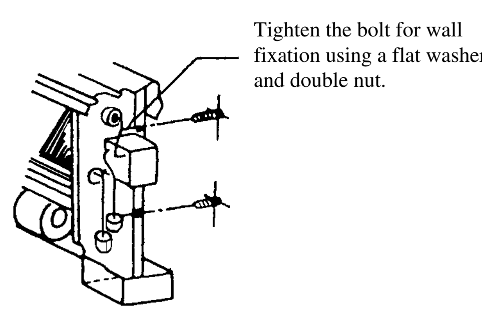
d) Level the unit using the level adjusting screw. Installation will be complrted after attaching side and front panel.

e) Exceute fixation following the directions described below.

- When fixed on the floor



- When fixed on the wall



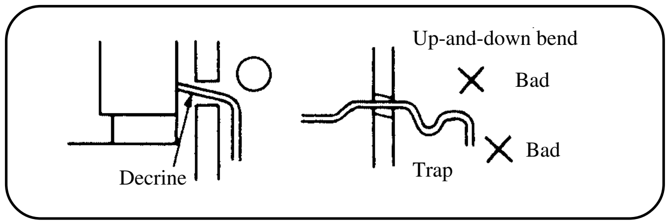
(d) Drain piping

The drain piping can be directed to the floor or rear sides as follows.

(a) Connect a drain piping to the drain outlet and fix it by use of tigghening band.

(b) Indoor side drain piping must be thermally insulated.

(c) After finishing the drain piping, check the drainage by pouring some water in the drain pan.



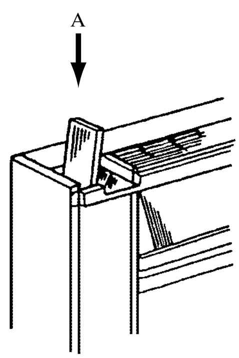
(e) Installation of remote controller (on the indoor unit)

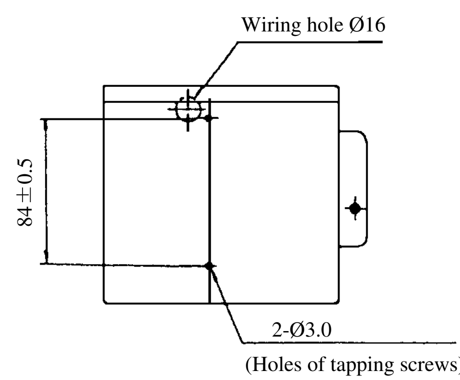
Attached remote controller may be installed on the indoor unit as shown below. The work can be done on the spot when the customer asks so or by other reasons.

Refer to the page 176 when it is instralled on the wall.

1) Detach the front panel.

Unit: mm





VIEW A

2) Remote controller installation.

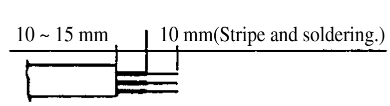
- Attach the lower case with the screws (M4 × 128) accessory.

3) Remote controller wiring.

a) Connect the terminals between the remote controller and the control box as per these wire color codes:[(X) (red). (Y) (white), (Z) (biack)], using the wires included in the kit.

b) The wires should have a surplus length of approximately 30 cm. (Necessary when servicing with the front panel detached.)

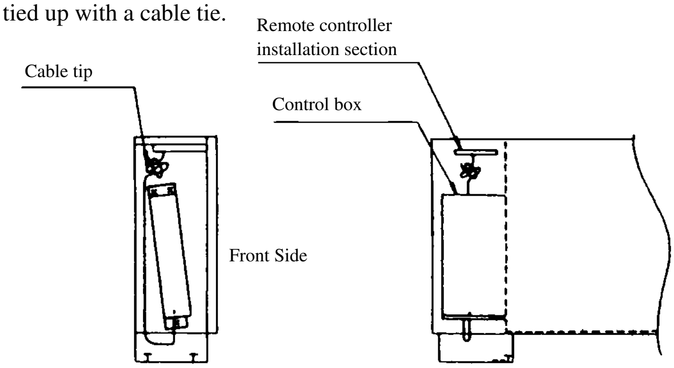
c) Strip and solder as shown below when cutting the wire. (Omitting the soldering process may cause looseness of the wiring.)



4) Wiring route.

a) Wire from the wiring hole through the rear side of the control box to the terminal block.

b) Any suplus wires should be tied up with a cable tie.



(11) Floor standing hidden type (FDFU)

(a) Selection of installation hidden location

1) A place where good air circulation and delivery can be obtained.

● Cold air throw

Unit : m

Models	All models
Air throw	**4**

[Conditions]

(1) Fan speed: Hi

(2) Location: Free space without obstacles

(3) Distance of reach indicates the horizontal distance after the wind touched down the floor.

(4) Air velocity at the throw: 0.5 (m/sec.)

2) Where there is no obstacle around the Air inlet port or Air outlet port.

3) Where a sufficient space can be reserved for the service of air filter and the attachment/removal of panels.

4) Places exposed to oil splashes or steam (e.g. kitchens and machine plants).
Installation and use at such places will incur deteriorations in the performance or corrosion with the heat exchanger or damage in molded synthetic resin parts.

5) Where pipes and wires can be arranged conveniently.

6) On the solid floor

7) Where the unit is not exposed directly to sun light.

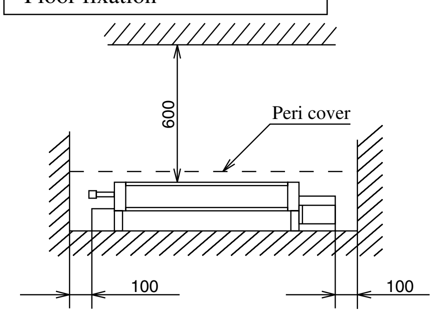
8) Places where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such place will cause corrosion in the heat exchanger and damage in molded synthtic resin parts.

9) Where a complete draining can be assured.

10) Where a sufficient space can be reserved for service.

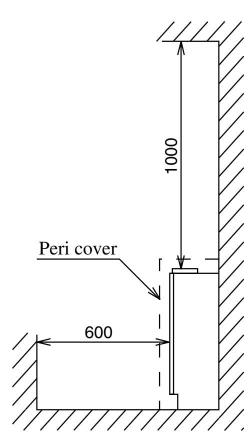
Floor standing installation

• Floor fixation



• Wall fixation

Unit : mm



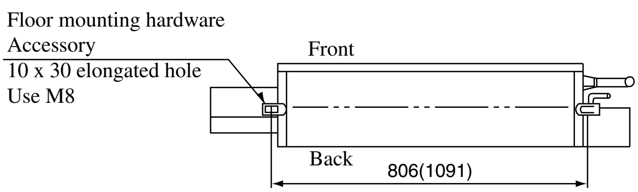
(b) Bolt positions

1) Bolt positions for metal settings used for floor fixation.

- Metal fitting used for floor fixation (accessories).

Unit : mm

Bolt positions for floor mounting hardware

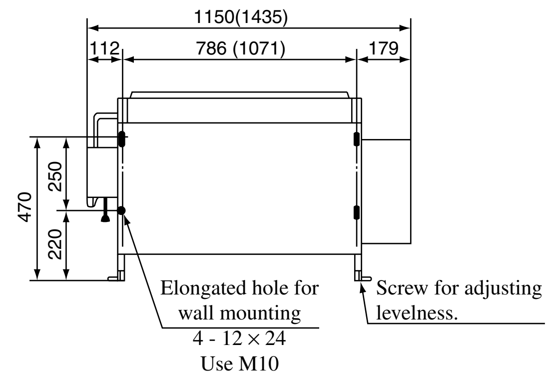


As viewed from floor side.

Note (1) Value in ( ) indicates 71 type.

2) Bolt positions for wall fixation

Unit : mm

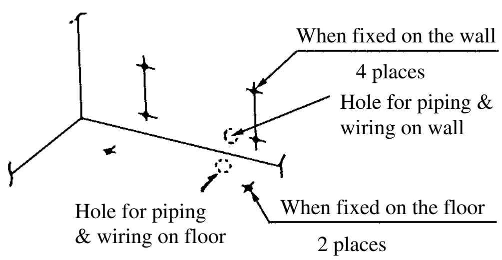


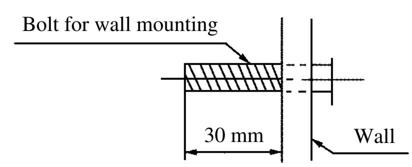
(c) Installation of unit

1) Floor standing installation

a) Position of mounting bracket fixing bolts

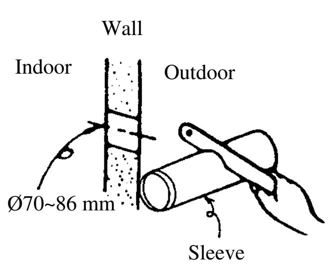
Drill holes by referring to figures below.

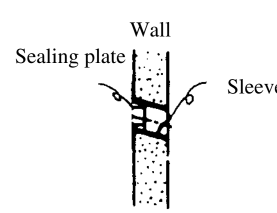




Note (1) Be sure to use a bolt of the length for wall mouning.

b) The methed of drilling the wall is as follows.

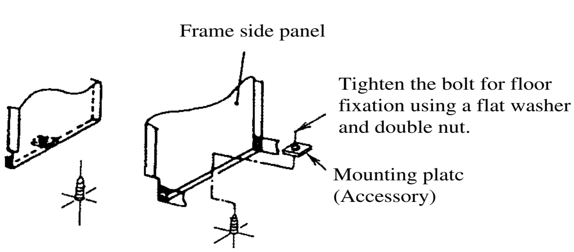




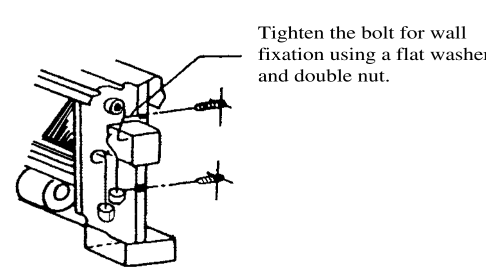
c) Level the unit using the level adjusting screw. Installation will be complrted after attaching side and front panel.

d) Exceute fixation following the directions described below.

- When fixed on the floor



- When fixed on the wall



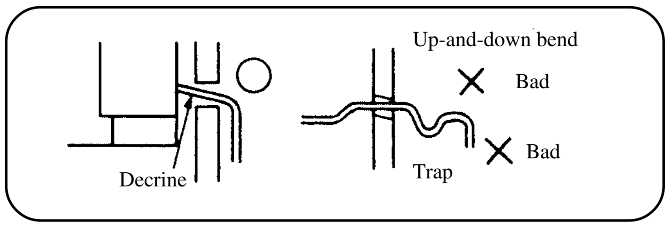
(d) Drain piping

The drain piping can be directed to the floor or rear sides as follows.

(a) Connect a drain piping to the drain outlet and fix it by use of tigghening band.

(b) Indoor side drain piping must be thermally insulated.

(c) After finishing the drain piping, check the drainage by pouring some water in the drain pan.



2.5.2 Installation of the remote controller (Optional parts)

(1) Selection of installation location

Following locations should be avoided:

(a) Where exposed to direct sunlight

(b) Near the heat source

(c) Highly humid area or where splashed with water

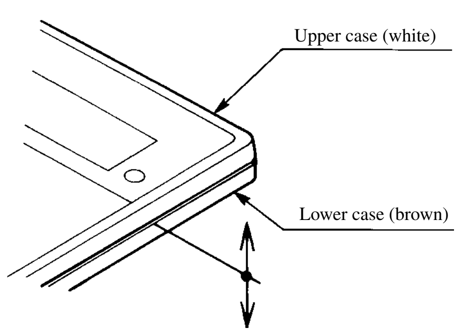
(d) Uneven installation surface

(2) Selection of installation location

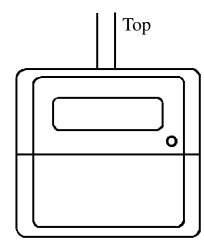
Exposed installation

(a) Remove the remote controller case.

- Insert finger nails between the upper (white) and lower (brown) cases and ply them to open.



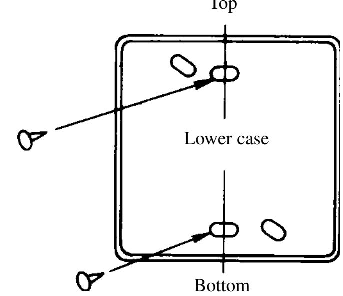
(b) Remote controller cords can be taken out upward only as shown below.



(Cord take-out direction)

- Cut the remote controller lower case off at the top and thin section with a nipper, knife or other and remove burrs from the cut with a file or other.

(c) Secure the remote controller lower case on the wall with 2 pieces of wood-screws.



(d) Connect the remote controller cords with the terminal block. Make sure to align the terminal numbers on the indoor unit and the remote controller. Polarities are specified on the terminal block so that the unit will not be operated if the cords are connected improperly.
Terminals: (X) red wire, (Y) white wire, (Z) black wire

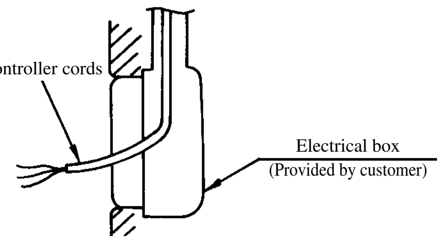
(e) Set necessary functions in accordance with the model of indoor unit.

(f) Couple the upper case with the lower case as they were.

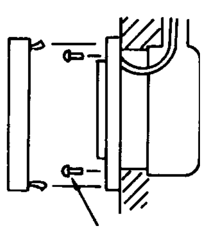
(g) Secure the remote controller cords on the wall or other using cord clamps.

Embedded installation

1) Have a electrical box and remote controller cords (use shielding wires or twisted pair wires for extension) embedded in the wall in advance.



2) Remove the upper case from the remote controller.
3) Secure the remote controller body on the electrical box with 2 pieces of M4 round head screw (provided by customer).
4) Connect remote controller cords with the remote controller.
(Refer to the section regarding the exposed installation.)
5) Couple the upper case with the lower case as it was to finish up the installation.



Cautions for extension of remote controller cords

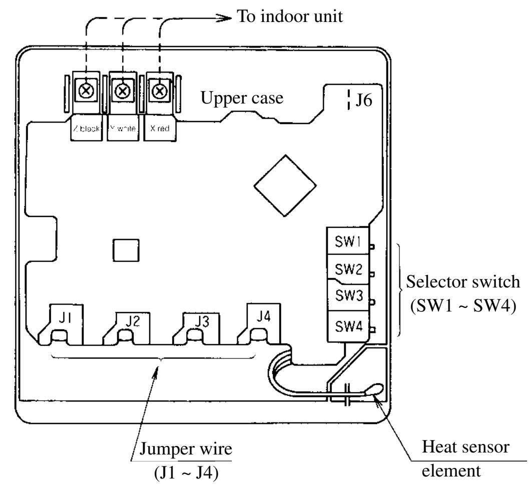
- **Make sure to use shielding wires only.**
- **All models: 0.3 mm² x 3 core wires [MVVS3C, products of Keihan Cables]**

Note (1) When the extension distance exceeds 100 m, change the wire size as follows:
100 ~ 200 m ... 0.50 mm² × 3 core wires
~ 300 m ... 0.75 mm² × 3 core wires
~ 400 m ... 1.25 mm² × 3 core wires
~ 600 m ... 2.00 mm² × 3 core wires

- **Make sure to ground one side only of the shielding wire.**

(3) Setting the functions

Change the setting of selector switches (WS1~ SW4) and jumper wires (J1~ J6) in accordance the functions of indoor unit and purposes of use.



Functions of selector switches

Switch		Function
SW1	C	Model type - Cooling only
	H	Model type - Heat pump model
SW2	ON	Remote control sensor - Valid
	OFF	Remote control sensor - Invalid
SW3	ON	Power failure compensation - Provided
	OFF	Power failure compensation - Not provided
SW4	S	Remote controller selector - Slave
	M	Remote controller selector - Master

Functions of jumper wires

Name		Function
J1	With	Return air temperature display - Valid
	None (1)	Return air temperature display - Invalid
J2	With	Blow rate display - 3 speed
	None (1)	Blow rate display - 2 speed
J3	With	Timer function - Valid (Normal)
	None (1)	Timer function - Invalid
J4	With	Auto swing display-With
	None (1)	Auto swing display - None
J6	With	For KX multi
	None (1)	For KXR multi

Note (1) "None" means it is not installed on the PCB or open.

2.5.3 Installation of outdoor unit

(1) Selection of installation location

(a) A palce where air will not be stagnant.

(b) A place where the exhaust air will not be shorteyeled.

(c) A place with enough space for air flow around the unit.

(d) A place where the unit will not be affected by other heat sources.
(when there are multiple units installed or when units have another heat source)

(e) A void installing the unit in places that are subject to sea air, sulfureous gas of the type found in hot springs, or any other corrosive or flammable gas.

(f) A place where smooth drainage of rain water and water formed by defrosting is acceptable.

(g) In heating operation, snow deposit on the heat-exchanger of outdoor unit must be prevented for keeping the normal performance capacity.

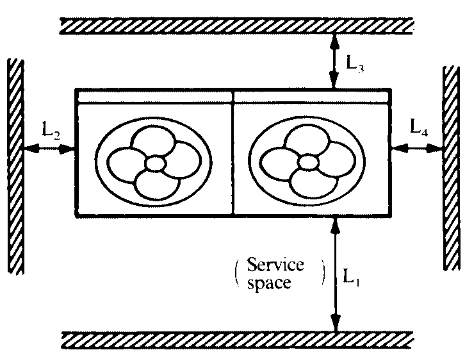
- Snow-hood no outdoor unit as in drawing, will reduce the frequency of defrost operation.
  When installing the snow hood, take care so that the air outlet of the snow hood will not face directly into the most windy direction.
- Design the base higher than possible snow deposit.

(h) A place where air outlet port is not exposed to strong wind.

(2) Installation space

A place with enough space for air inlet, air outlet and service space.

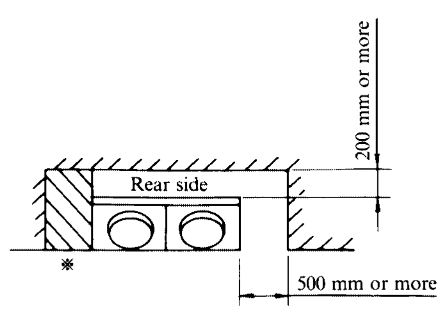
(a) Independent installation



Dimension Unit: mm

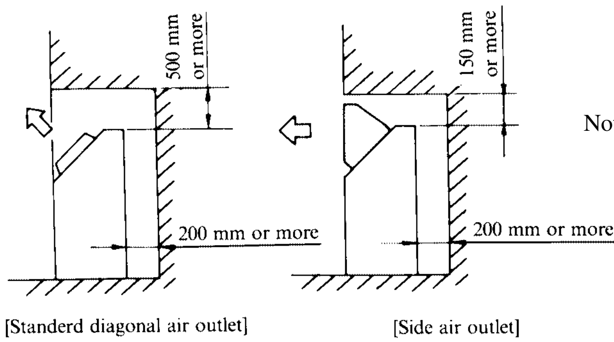
Installation example / Distance	I	II	III
L_1	open	open	500
L_2	0	500	500
L_3	200	200	200
L_4	500	0	500

1) When there are obstacles on the sides and at the rear side of the unit



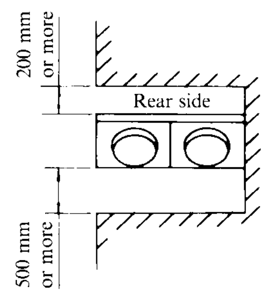
Note (1) The unit can be installed bringing the right side close to the obstacle. In that case, provide a space over 500 mm to the left side.

2) When there is an obstacle above the unit

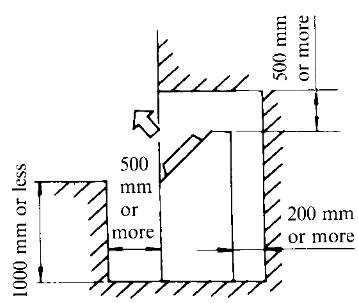


Note (1) The side air outlet indicates that a wind direction variable adapter available on the optional parts is fitted to the unit.

3) When there is an obstacle (are obstacles) on the side (in front side of and at the rear side) of the unit

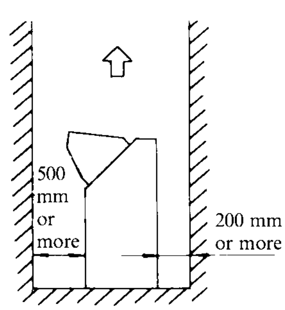


4) When there is an obstacle above the unit as well



[Standerd diagonal air outlet]

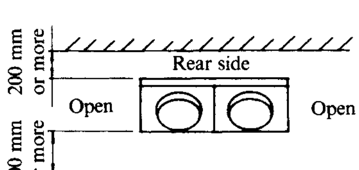
5) When there is no obstacle above the unit



[Up air outlet]

Note (1) The side air outlet and the up air outlet indicate that wind direction variable adapters available on the optional parts are fitted to the unit.

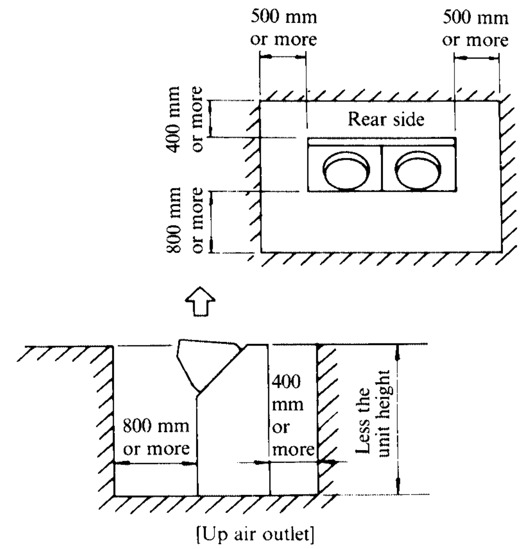
6) When installed in a narrow space (there are obstacles in front side of and at the rear side of the unit.)



[Remarks]

When there is a space above the unit, install the unit in the same way as you do when there is an obstacle (are obstacles) on a side (in front side of and at the rear side) of the unit.

7) Installation where there is obstacle on all four sides.

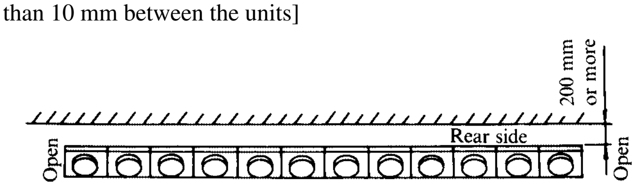


Note (1) The up air outlet indicates that a wind direction variable adaptor available on the optional parts is fitted on the unit.

(b) Installation of multiple units

1) Continuous installation on side-to-side [The front side is open]

[Keep a space of more than 10 mm between the units]

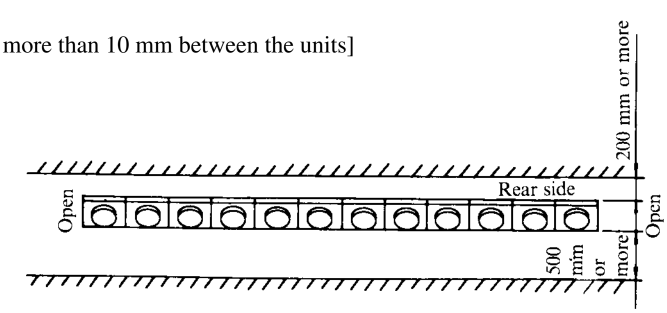


Note (1) There shall be no obstacle above the unit.

[Remarks] When the unit is installed continuously side by side, any multiple units can be installed.

2) Continuous Installation on side-to-side [There are obstacles in front side of and at the rear side of the unit.]

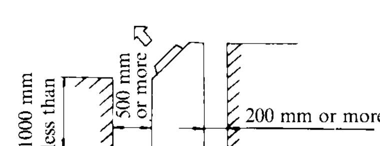
[Keep a space of more than 10 mm between the units]



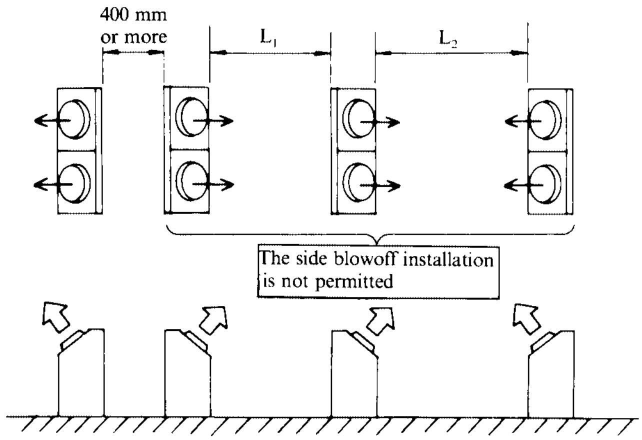
Note (1) The obstacle at the rear side shall be lower than the unit, and the obstacle in front side shall be less than 1000 mm.

[Remarks] When the unit is installed continuously side by side, any multiple units can be installed.

Note (1) When an up air outlet is selected optionally, the obstacle in front can be made lower than the unit.



3) Face-to-face installation



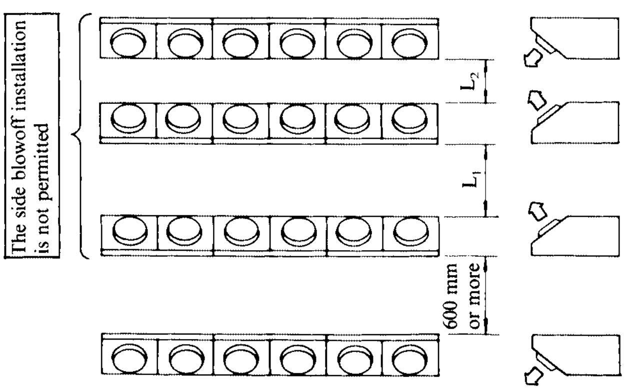
Dimension Unit: mm

Item \ Distance	L_1	L_2
Diagonal	1500 or more	1000 or more
Up air outlet	500 or more	500 or more

Note (1) Make the air outlet the diagonal air outlet (standard) or the up air outlet (option).

4) Side-to-side & face-to-face installation

[Keep a space of more than 10 mm between the unit]



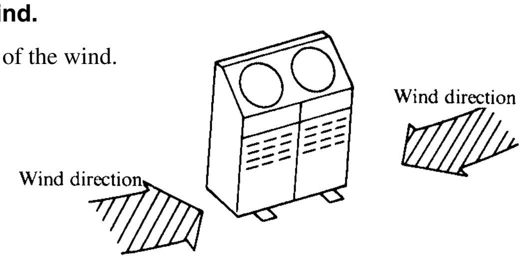
Dimension Unit: mm

Item \ Distance	L_1	L_2
Diagonal	1500 or more	1000 or more
Up air outlet	800 or more	800 or more

Note (1) Make the air outlet the diagonal air outlet (standard) or the up air outlet (option).

5) In the case where the unit is exposed to strong wind.

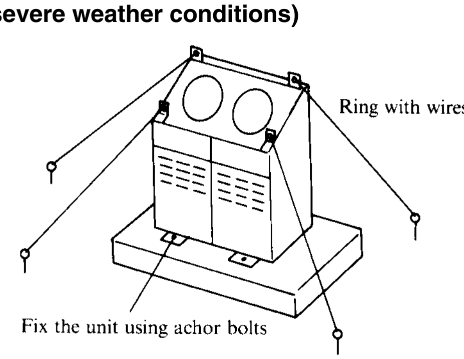
a) Face the unit air outlet at a 90º angle from the direction of the wind.



b) Securing outdoor unit (in the case of exposure to severe weather conditions)

Fix the unit in the following way.

- Use overtuming prevention brackets.
- Rig with wires.



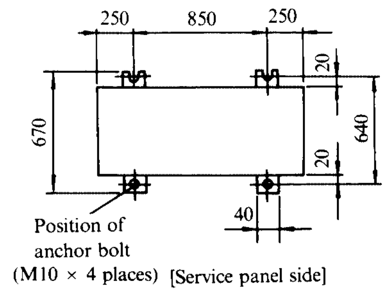
(Use rigging wires that are resistant to corrosion and sufficient in strength. For example SUS304-W1, wire thick-ness 2.9 mm)

(3) Installation

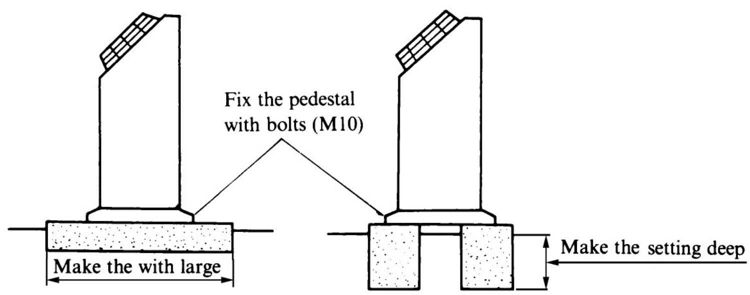
Fix the unit in a proper way according to the condition of a place where it is installed by referring to the following.

(a) Fix the unit to the foundation with anchor bolts.

Unit: mm



(b) When installing the unit, be sure to fix the pedestal of the unit with bolts.



(c) Install the unit securely not to be fallen by earthquake or strong of wind.

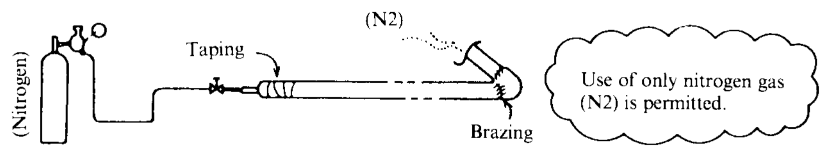
(d) Prepare a concrete foundation referring to the above figure.

2.5.4 Refrigerant piping

(1) Precautions no refrigerant piping work for prevention against compressor lock

Compressor trouble including lock and motor burn-out is due to faulty parts but mainly concerned in installation and refrigerant piping conditions, The precautions for refrigerant piping are as belows.

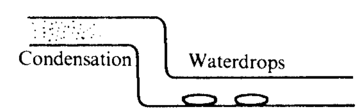
(a) Be sure to perform brazing while flowing nitrogen.

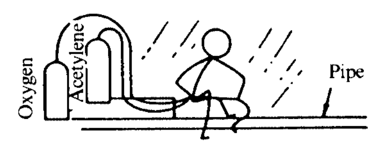


1) Without flowing nitrogen gas, a lot of oxide film (CU_2O) is generated. In particular, in case of for building with many brazed portions, oxide film is so much generated that this causes a fatal failure in the air conditioning system.
2) A foreign material (oxide film) causes clogging of the capillary tube or expansion valve, leading to non-cooling (non-heating), abnormal discharge temperature, compressor lock due to a faulty oil return. In some cases, a lot of foreign materials block the oil return hole of the accumulator, thereby causing a compressor lock. (This lock trouble may occur repeatedly 2 or 3 times.)

(b) Don't admit water (waterdrops, condensation) into the piping.

1) Use a copper piping that is free from water (waterdrops, condensation).
2) Don't perform refrigerant piping work while it rains.
3) To suspend outdoor piping work, perform curing to prevent water admission.





Bad effects of water

- Capillary tube and expansion valve clogging
- Refrigerant hydrolysis → "Acid" generation → Iron/copper corrosion
- Crystal foreign material (clathrate compound) generation resulting from reaction on refrigerating machine oil

There will be directly conected to serious trouble such as compressor lock or burn-out of the compressor motor.

(c) Don't admit dust or foreign particles in the pipe.

Various foreign particles are included in air conditioners that caused trouble. Be careful about them.
(Concrete fragments, cement, sand, paint, metal powder (copper refuse after deburring, etc.), etc.

(d) Adopt the specified dimensions for pipes.

Too thick:
- Improper charge volume
- Faulty oil return (insufficient gas flow rate)

→ **Compressor lock**

Too long (L):
- Overcharge — Liquid back
- Faulty oil return

→ **Compressor lock**

(e) Be sure to support the refrigerant piping with support fittings.

1) The pipe vibrates and expands/shinks during operation. Without proper supports, a load is concentrated partially and cracks and collapse occur on the piping, thereby causing a unit failure.
2) A support should be provided at intervals of 2 or 3 m so as not to partially concentrate a load.

(2) Refrigerant piping size selection

(a) Central flow divide system

Item \ Medel		FDCP224HKXRE2A (V)			FDCP280HKXRE2A (V)		
		Discharge gas piping	Intake gas piping	Liquid piping	Discharge gas piping	Intake gas piping	Liquid piping
Outdoor unit		ϕ19.05	ϕ 25.4	ϕ 12.7	ϕ 19.05	ϕ 28.58	ϕ 12.7
Main piping		ϕ19.05	ϕ 25.4	ϕ 12.7	ϕ 19.05	ϕ 28.58	ϕ 12.7
Total indoor unit down-flow capacity after the second branch.	less than 101	ϕ12.7	ϕ 15.88	ϕ 9.52	ϕ 12.7	ϕ 15.88	ϕ 9.52
	101 to less than 180	ϕ15.88	ϕ 19.05	ϕ 9.52	ϕ 15.88	ϕ 19.05	ϕ 9.52
	180 to less than 364	ϕ19.05	ϕ 25.4	ϕ 12.7	ϕ 19.05	ϕ 25.4	ϕ 12.7
Central flow divide controller		HPFD02R-E (for 2 units) , HPFD04R-E (for 4 units), HPFD06R-E (for 6 units)					
Branch piping set		DIS-IKXR3-E (Horizontal branch piping set for 3 pipes) DIS-IKXR2-E (Branch piping set for 2 pipes)					

- **Pipe size for central flow divide controller**

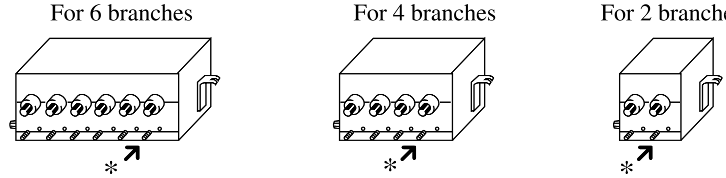
Part No : HPFD02R-E, HPFD04R-E, HPFD06R-E

Item \ Classification	Discharge gas piping	Intake gas piping	Liquid piping
Indoor unit side	ϕ 15.88		ϕ 9.52
Outdoor unit side	ϕ 19.05	ϕ 28.58	ϕ 12.7

Notes (1) Confirm that the flare connectors of the refrigerant pipe connection port on the central flow divide controller is surely closed where indoor unit is not connected.

(2) Connect the indoor unit to the pipe connection port in sequence from the front right side (*mark in the illustration below) of the central flow divide controller. (Do not leave the right side port unconnected.)
Ensure to connect from the right side even if the number of indoor units to be connected is less than the number of branches.

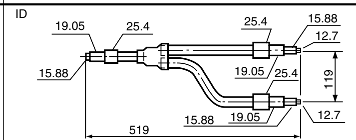
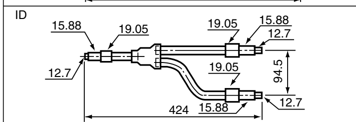
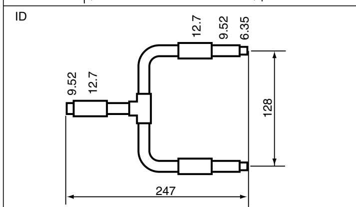
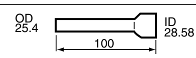
For 6 branches For 4 branches For 2 branches



(b) Individual flow divide system

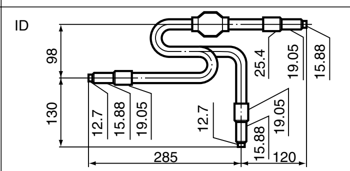
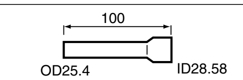
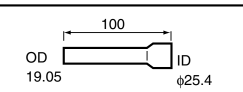
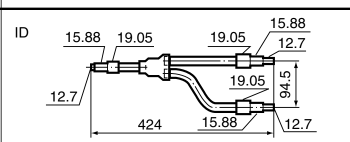
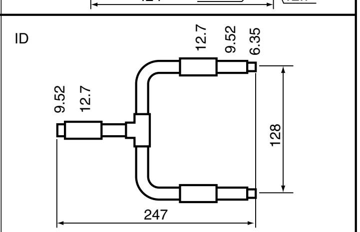
Item \ Medel		FDCP224HKXRE2A (V)			FDCP280HKXRE2A (V)		
		Discharge gas piping	Intake gas piping	Liquid piping	Discharge gas piping	Intake gas piping	Liquid piping
Outdoor unit		ϕ 19.05	ϕ 25.4	ϕ 12.7	ϕ 19.05	ϕ 28.58	ϕ 12.7
Main piping		ϕ 19.05	ϕ 25.4	ϕ 12.7	ϕ 19.05	ϕ 28.58	ϕ 12.7
Total indoor unit down-flow capacity after the second branch.	less than 56	ϕ 12.7	ϕ 15.88	ϕ 6.35	ϕ 12.7	ϕ 15.88	ϕ 6.35
	56 to less than 101	ϕ 12.7	ϕ 15.88	ϕ 9.52	ϕ 12.7	ϕ 15.88	ϕ 9.52
	101 to less than 180	ϕ 15.88	ϕ 19.05	ϕ 9.52	ϕ 15.88	ϕ 19.05	ϕ 9.52
	180 to less than 364	ϕ 19.05	ϕ 25.4	ϕ 12.7	ϕ 19.05	ϕ 25.4	ϕ 12.7
Individual flow divide controller	Indoor unit side	ϕ 15.88	ϕ 15.88	ϕ 9.52	ϕ 15.88	ϕ 15.88	ϕ 9.52
	Outdoor unit side	ϕ 15.88	ϕ 19.05	ϕ 12.7	ϕ 15.88	ϕ 19.05	ϕ 12.7
Individual flow divide controller		HPFD01R-E					
Branch piping set		DIS-1KXR3-E, DIS-V1KXR3-E, DIS-1KXR2-E					

Branch pipe set part shapes (DIS-1KXR3-E)

Symbol	Name	Part shape	Quantity	Remarks
①	Branch pipe		1	Intake gas piping
②	Branch pipe		1	Discharge gas piping
③	Branch pipe		1	Liquid piping
ⓐ	Reducer		1	Intake gas piping [FDCP280HKXRE2A (V)]

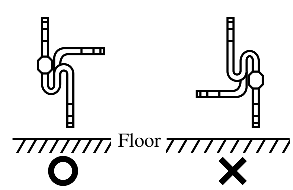
Notes(1) Each flow divider pipe is surrounded with insulation.
(2) Each pipe is cut off in the middle of the diameter that is used in that locality.

Shapes of accessory parts for brunch pipe set for vertical divides (DIS-V1KXR3-E)

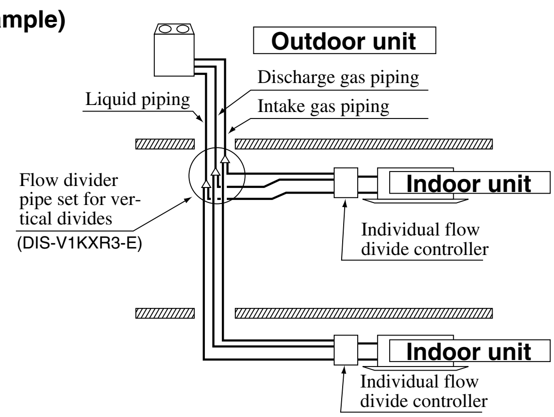
Classification	Symbol	Branch pipe	Classification	Symbol	Reducer
Intake gas piping	①		Intake gas piping	—	
				—	
Discharge gas piping	②				
Liquid piping	③				

Notes (1) Insulation is provided to all flow divider pipes.
(2) Cut off the flow divider pipes in the center to match the diameter of the piping used on site.

Reference 1: Be sure to install the vertical flow divider coupling (both) for gas and liquid) as "vertical divide" as illustrated below.

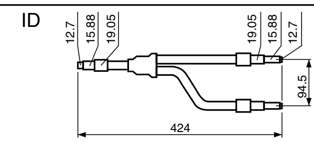
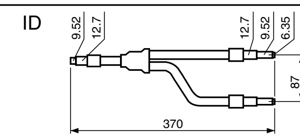


(Example)



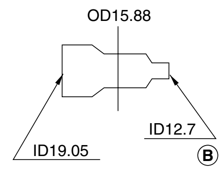
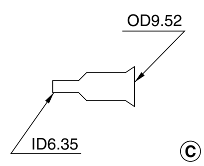
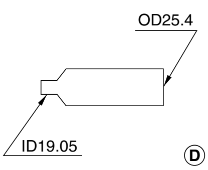
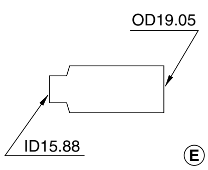
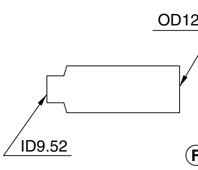
When the outdoor unit are installed at a higher level than the individual flow divide controller and a vertical flow divider is required for the piping connections of 2 or more individual flow divide controllers for 1 module, use the "flow divider pipe set" for vertical divides.
●Flow divider pipe set for vertical divides Part No. DIS-V1KXR3-E

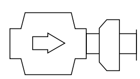
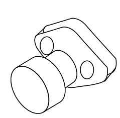
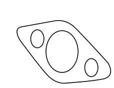
●**Table of branch pipe set shape (For 2 pipes) (DIS-1KXR2-E)**

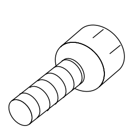
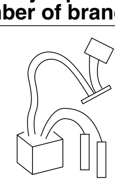
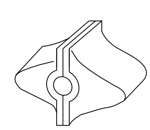
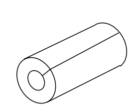
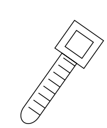
Classi-fication	Branch pipe	Classi-fication	Branch pipe
Gas piping		Liquid piping	

Use for connection to the indoor unit in the same mode of cooling and heating.

(c) Shapes of central flow divide controller accessories (HPFD02-E, 04R-E, 06R-E)

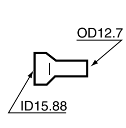
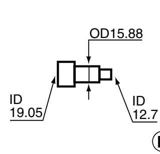
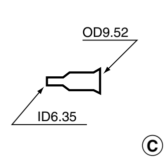
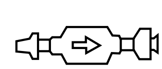
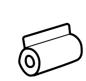
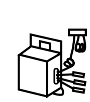
Name	Redncer				
Application	For indoor gas piping	For indoor liquid piping	For outdoor intake gas piping	For outdoor discharge gas piping	For outdoor liquid piping
Quantity	Quantity equal to the number of branches	Quantity equal to the number of branches	1	1	1
Shaps					

Name	Strainer coupling	Flange coupling	Packing
Application	For outdoor discharge gas piping	For outdoor intake gas piping	For flang
Quantity	1	1	1
Shaps			

Name	Washer bolt	Relay kit	Insulation		Band
Application	For flang	For contrlo	For flange cover	For piping cover	For piping cover
Quantity	2	Quantity equal to the number of branches	1	Quantity equal to the number of pipe connections	Quantity equal to the number of pipe connections × 2
Shaps					

Note(1) These parts are essential except the different diameter adapter coupling.

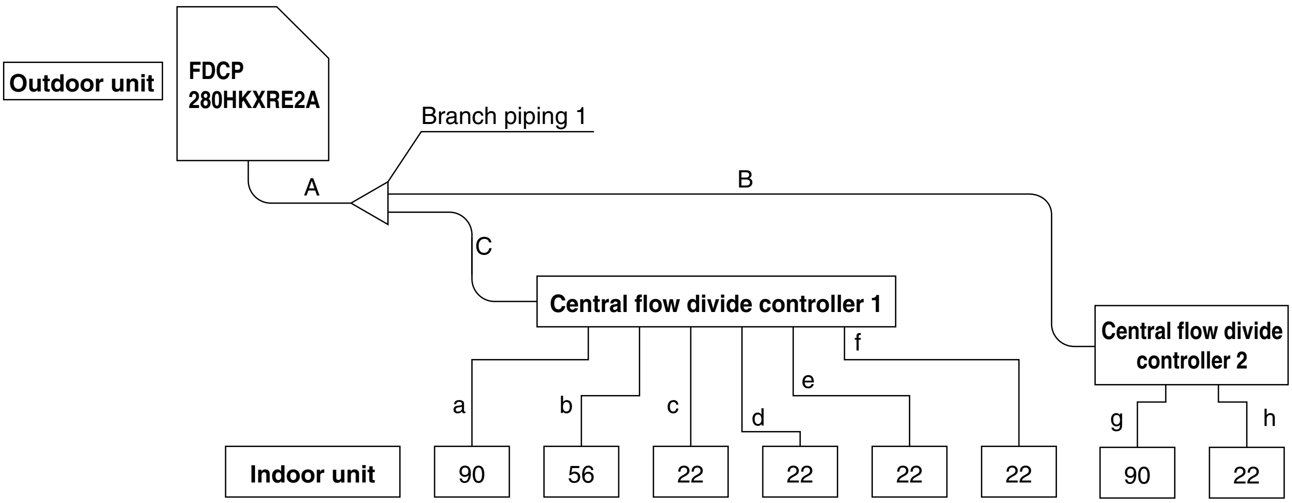
(d) Shapes of individual flow divide controller accessories (HPFD1R-E)

Name	Reducer			Strainer coupline	Insulation	Relay kit
Application	For outdoor discharge gas piping	For outdoor intake and indoor gas piping	For outdoor and indoor liquid piping	For outdoor discharge gas piping	For pipe cover	For controller
Quantity	1	2	2	1	Piping connection	1
Shaps						

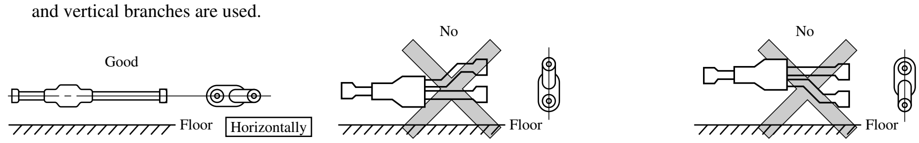
Example of piping

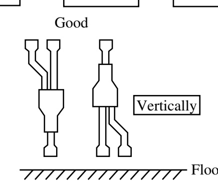
■ Central flow divide controller system

Total capacity : 346



Note (1) When making branch connections (for both gas and liquid lines), be sure that the proper horizontal branches and vertical branches are used.





● **Selecting piping size**

Item	Selection procedure	Piping size (mm)		
		Discharge gas line	Intake gas line	Liquid line
A	Same as the outdoor unit piping size (FDCP280HKXRE2A)	φ 19.05	φ 28.58	φ 12.7
B	Total capacity of the connected indoor unit (90+22) 112	φ 15.88	φ 19.05	φ 9.52
C	Total capacity of the connected indoor unit (90+56+22+22+22+22) 234	φ 19.05	φ 25.4	φ 12.7
a	Indoor unit piping size (90)	φ 15.88		φ 9.52
b	Indoor unit piping size (56)	φ 15.88		φ 9.52
c ~ f	Indoor unit piping size (22)	φ 12.7		φ 6.35
g	Indoor unit piping size (90)	φ 15.88		φ 9.52
h	Indoor unit piping size (22)	φ 12.7		φ 6.35

● **Selection of central flow divide controller**

Item	Selection procedure	Central flow divide controller
Central flow divide controller 1	Select according to the number of indoor units to be connected.	HPFD06R-E
Central flow divide controller 2		HPFD02R-E

● **Branch piping set**

Item	Branch piping set
Branch piping 1	DIS-1KXR3-E

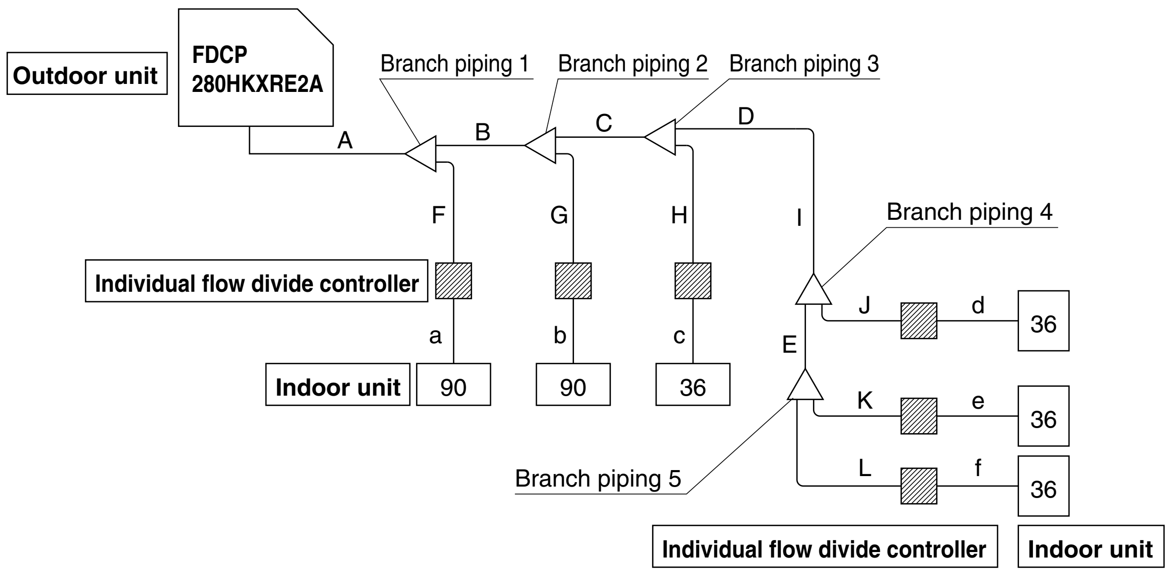
Note (1) Select the appropriate different diameter adapter coupling attached to the central flow divide controller according to the pipe size.

Usable central flow divide controller in more than 8 indoor units connecting.

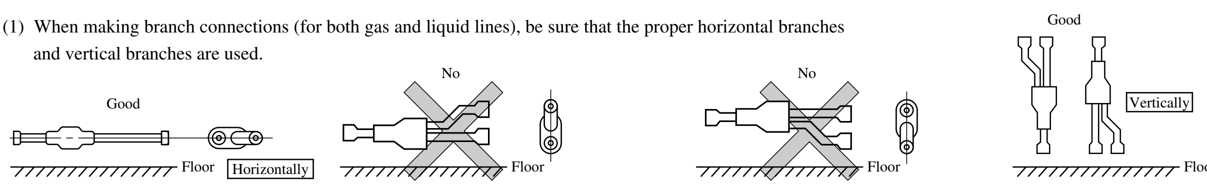
Number of connected indoor units	Central flow divide controller
9, 10 units	HPFD04R-E + HPFD06R-E
11, 12 units	HPFD06R-E × 2 or HPFD04R-E × 3
13, 14 units	HPFD04R-E × 2 + HPFD06R-E × 1
15, 16 units	HPFD04R-E + HPFD06R-E × 2 or HPFD04R-E × 4

■ Individual flow divide controller system

Total capacity : 324



Note (1) When making branch connections (for both gas and liquid lines), be sure that the proper horizontal branches and vertical branches are used.



● **Selecting piping size**

Item	Selection procedure	Piping size (mm)		
		Discharge gas line	Intake gas line	Liquid line
A	Same as the outdoor unit piping size (FDCP280HKXRE2A)	ϕ 19.05	ϕ 28.58	ϕ 12.7
B	Total capacity of the connected indoor unit (90+36+36+36+36) 234	ϕ 19.05	ϕ 25.4	ϕ 12.7
C	Total capacity of the connected indoor unit (36+36+36+36) 144	ϕ 15.88	ϕ 19.05	ϕ 9.52
D	Total capacity of the connected indoor unit (36+36+36) 108	ϕ 15.88	ϕ 19.05	ϕ 9.52
E	Total capacity of the connected indoor unit (36+36) 72	ϕ 12.7	ϕ 15.88	ϕ 9.52
F . G	Total capacity of the connected indoor unit (90)	ϕ 12.7	ϕ 15.88	ϕ 9.52
H ~ L	Total capacity of the connected indoor unit (36)	ϕ 12.7	ϕ 15.88	ϕ 9.52
a . b	Indoor unit piping size (90)	ϕ 15.88		ϕ 9.52
c ~ f	Indoor unit piping size (36)	ϕ 12.7		ϕ 6.35

● **Branch piping set**

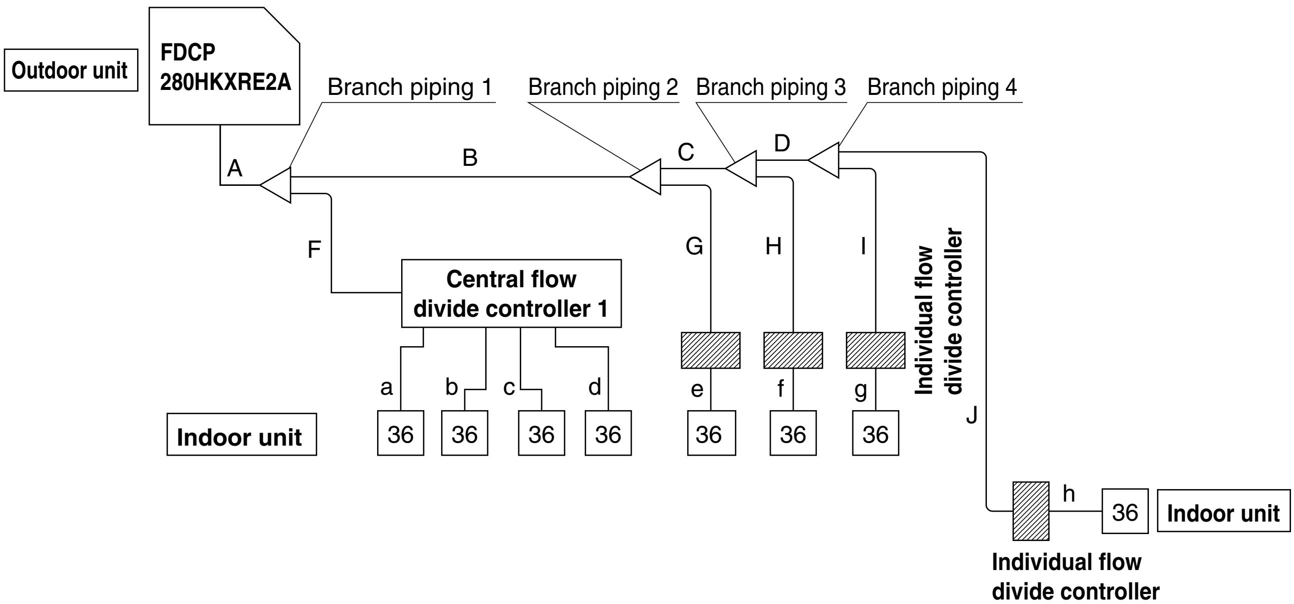
Item	Branch piping set
Branch piping 1~3	Horizontal branch piping set (DIS-1KXR3-E)
Branch piping 4 · 5	Vertical branch piping set (DIS-V1KXR3-E)

● **Individual flow divide controller : HPFD01R-E**

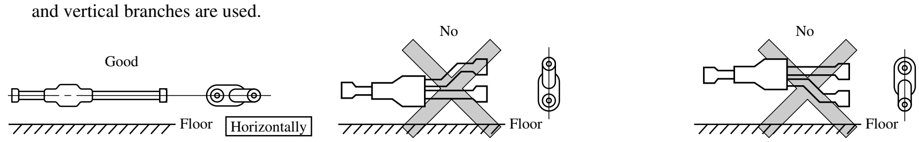
Note (1) Select the appropriate different diameter adapter coupling attached to the individual flow divide controller according to the pipe size.

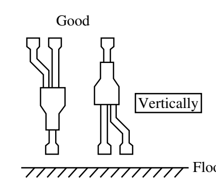
■ Mixed system of central and individual flow divide controllers

Total capacity : 288



Note (1) When making branch connections (for both gas and liquid lines), be sure that the proper horizontal branches and vertical branches are used.





● **Selecting piping size**

Item	Selection procedure		Piping size (mm)		
			Discharge gas line	Intake gas line	Liquid line
A	Same as the outdoor unit piping size (FDCP280HKXRE2A)		ϕ 19.05	ϕ 28.58	ϕ 12.7
B	Total capacity of the connected indoor unit (36+36+36+36)	144	ϕ 15.88	ϕ 19.05	ϕ 9.52
C	Total capacity of the connected indoor unit (36+36+36)	108	ϕ 15.88	ϕ 19.05	ϕ 9.52
D	Total capacity of the connected indoor unit (36+36)	72	ϕ 12.7	ϕ 15.88	ϕ 9.52
F	Total capacity of the connected indoor unit (36+36+36+36)	144	ϕ 15.88	ϕ 19.05	ϕ 9.52
G ~ J	Capacity of the connected indoor unit (36)		ϕ 12.7	ϕ 15.88	ϕ 6.35
a ~ h	Indoor unit piping size (36)		ϕ 12.7		ϕ 6.35

● **Branch piping set**

Item	Branch piping
Branch piping 1~4	Horizontal branch piping set (DIS-1KXR3-E)

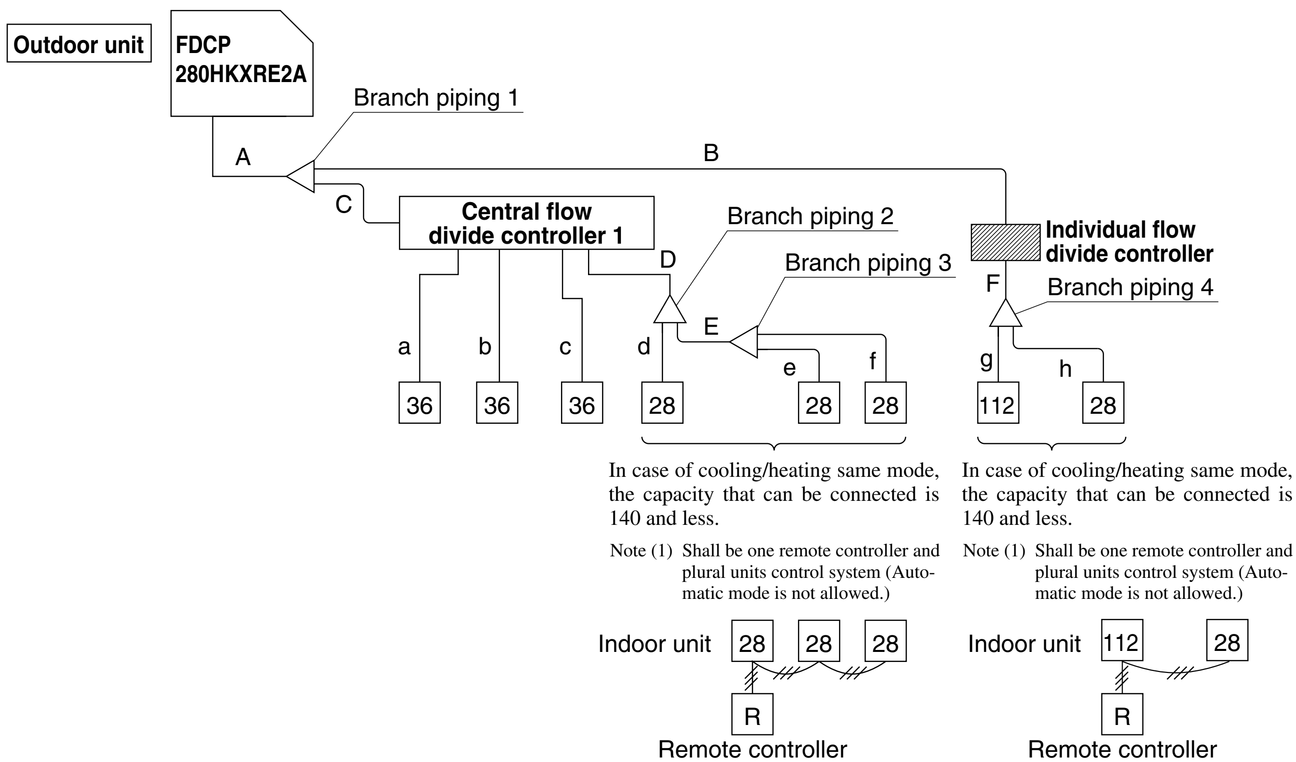
● **Central flow divide controller**

Item	Selection procedure	Central flow divide controller
Central flow divide controller 1	Select according to the number of indoor units to be connected.	HPFD04R-E

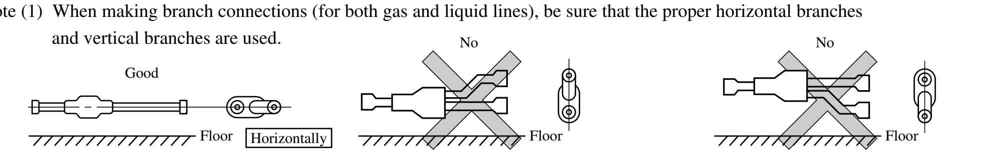
● **Individual flow divide controller : HPFD01R-E**

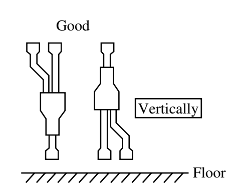
■ Mixed system of cooling and heating in same mode

Total capacity : 332



Note (1) When making branch connections (for both gas and liquid lines), be sure that the proper horizontal branches and vertical branches are used.





● **Selecting piping size**

Item	Selection procedure		Piping size (mm)		
			Discharge gas line	Intake gas line	Liquid line
A	Same as the outdoor unit piping size (FDCP280HKXRE2A)		ϕ 19.05	ϕ 28.58	ϕ 12.7
B	Total capacity of the connected indoor unit (112+28)	140	ϕ 15.88	ϕ 19.05	ϕ 9.52
C	Total capacity of the connected indoor unit (36+36+36+28)	136	ϕ 15.88	ϕ 19.05	ϕ 9.52
D	Total capacity of the connected indoor unit (28+28+28)	84	ϕ 15.88		ϕ 9.52
E	Total capacity of the connected indoor unit (28+28)	56	ϕ 15.88		ϕ 9.52
F	Total capacity of the connected indoor unit (112+28)	140	ϕ 19.05		ϕ 9.52
a ~ c	Indoor unit piping size (36)		ϕ 12.7		ϕ 6.35
d · e · f	Indoor unit piping size (28)		ϕ 12.7		ϕ 6.35
g	Indoor unit piping size (112)		ϕ 19.05		ϕ 9.52
h	Indoor unit piping size (28)		ϕ 12.7		ϕ 6.35

● **Branch piping set**

Item	Branch piping
Branch piping 1	Horizontal branch piping set (DIS-1KXR3-E)
Branch piping 2~4	Horizontal branch piping set (DIS-1KXR2-E)

● **Central flow divide controller : HPFD04R-E, Individual flow divide controller : HPFD01R-E**

■ Pipe connection procedures for individual flow divide controller

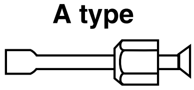
Piping connection instructions (for the above example)

Process the included reducer as illustrated below.

Use the flare nuts included with the individual flow divide controller.

- **When the indoor unit capacity is 101 or more**

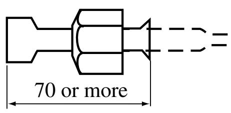
A type



Use reducer Ⓐ and process the ϕ12.7 portion into a flare.

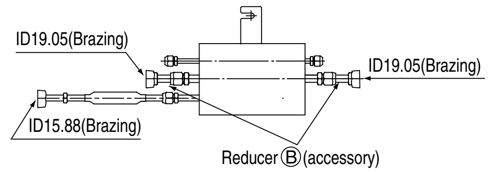
(OD12.7 → ID15.88)

B type



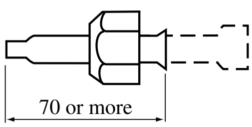
Cut off reducer Ⓑ using a pipe cutter as shown in the illustration and make a flare.

(OD15.88 → ID19.05)



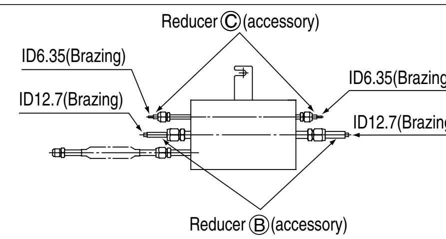
- **When the indoor unit capacity is 56 or less**

B type



Cut off reducer Ⓑ using a pipe cutter as shown in the illustration and make a flare.

(OD15.88 → ID12.7)

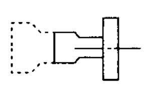


■ Pipe connection procedures for central flow divide controller

- Be sure to accessory stralner coupling in the discharge gas piping conneclion pipe.
- When connecting the liquid piping and gas piping to the indoor unite, be sure to connect connection pipes that have the same connection No. as the flow divede controller indoor unit connections.
- When connecting the piping to the flow divide controller and indoor unit, be sure to use two spanner wenches when tightening the flare connections.
- Be sure to securely plug any unused connections.
- Connect sach indoor unit in sequence from the front right pipe connection of the central flow drivide controller. (Never leave the right side disconnected.)
  If the number of indoor unit connections is less than the number of branches, always connect in sequancs from the right.

① Outdoor side piping connection

ⓐ When the intake gas piping is 25.4 dia.

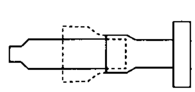


Cut off the flange coupling with a pipe cutter as shown. in the illustration and then use the part.

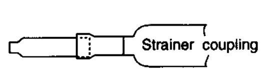
ⓑ When the total capacity of the connected indoor units less than 180 (not including 180).

Cut off the flange coupling at the 25.4 dia. area and use a different diameter adapter coupling D.
OD25.4 → ID19.5

intake gas piping

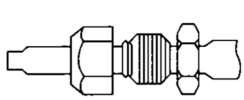


Discharge gas piping



Use different diameter adapter coupling E.
OD19.05 → ID15.88

Liquid piping



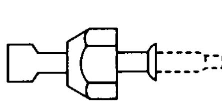
Use different diameter adapter coupling F.
OD12.7 → ID9.52

② Indoor side piping connection

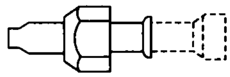
ⓐ When the indoor unit capacity is 112 or more.

Cut off the different diameter adapter coupling B with a pipe cutter as shown in the illustration and then make a flare.
OD15.88 → ID19.05

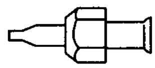
Gas piping



ⓑ When the indoor unit capacity is less than 56 (not including 56).

Gas piping 

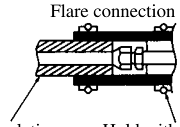
Cut off the different diameter adapter coupling B with a pipe cutter as shown in the illustration and then make a flare.
OD15.88 → ID12.7

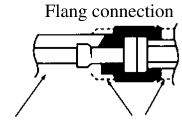
Liquid piping 

Use different diameter adapter coupling C.
OD9.52 → ID6.35

③ Refrigerant piping insulation

Be sure to insulate the pipe connection with a pipe cover or flange cover.





(3) Specification of unit piping (Pipe diameter. Connecting method)

(a) Unit

1) Outdoor unit

Unit: mm (in)

Item / Model	Discharge gas line		Intake gas line		Liquid line	
	Pipe diameter	Connecting method	Pipe diameter	Connecting method	Pipe diameter	Connecting method
FDCP224HKXRE2A 224HKXRE2V	ϕ19.05	Brazing	ϕ25.4 (1")	Brazing	ϕ12.7 (1/2")	Brazing
FDCP280HKXRE2A 280HKXRE2V	ϕ19.05		ϕ28.58 (1 1/8")		ϕ12.7 (1/2")	

2) Indoor unit

Unit: mm (in)

Item / Model	Gas line		Liquid line	
	Pipe diameter	Connecting method	Pipe diameter	Connecting method
22, 28 type	ϕ12.7 (1/2")	Flare	ϕ6.35 (1/4")	Flare
36 type	ϕ12.7 (1/2")		ϕ6.35 (1/4")	
45 type	ϕ12.7 (1/2")		ϕ6.35 (1/4")	
56, 71, 90 type	ϕ15.88 (5/8")		ϕ9.52 (3/8")	
112, 140 type	ϕ19.05 (3/4")		ϕ9.52 (3/8")	

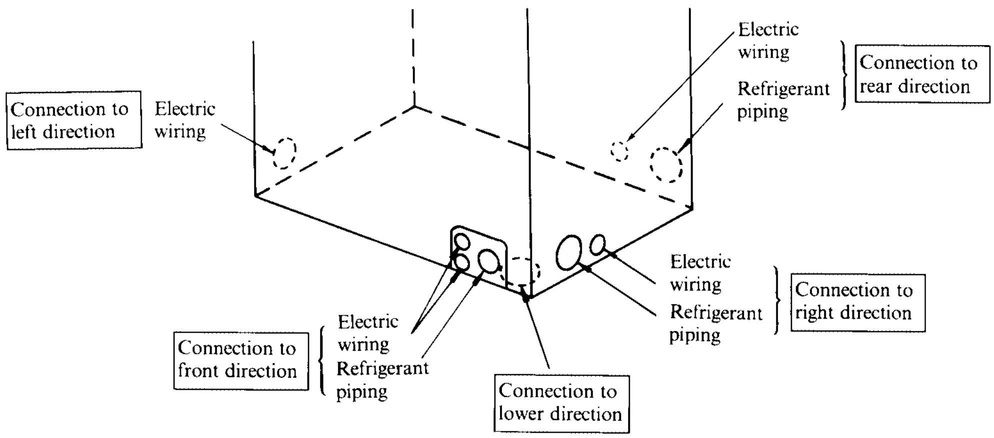
3) Connection piping specification: Outer diameter and wall thickness

Outer diameter (mm)	Wall thickness (mm)	Outer diameter (mm)	Wall thickness (mm)
ϕ6.35	0.8	ϕ19.05	1.0
ϕ9.52	0.8	ϕ25.4	1.0
ϕ12.7	0.8	ϕ28.58	1.0
ϕ15.88	1.0		

4) Tightening torque

ϕ6.35 (1/4") Flare nut	14~18N · m
ϕ9.52 (3/8") Flare nut	34~42N · m
ϕ12.7 (1/2") Flare nut	49~61N · m
ϕ15.88 (5/8") Flare nut	68~82N · m
ϕ19.05 (3/4") Flare nut	100~120N · m
Gas side flange bolt	30~40N · m

(b) Refrigerant piping connection



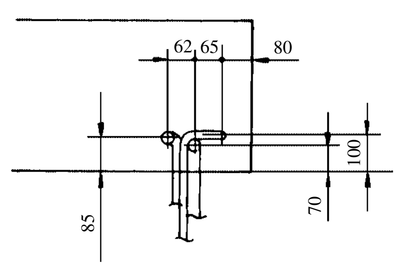
1) Pipes can be connected in four directions, but electric wire can be done in five directions.
2) Select the optimum connecting direction taking into account the installation conditions of outdoor unit and the positional relations with indoor units.
3) For connections to the operation valves and attendant piping, connect gas pipes first, then liquid pipes.
   - Remove the seal on the flange of the gas side service valve.
   - Place the accessory packing between the flanges of the gas side service valve and of the attendant piping for gas before connection.

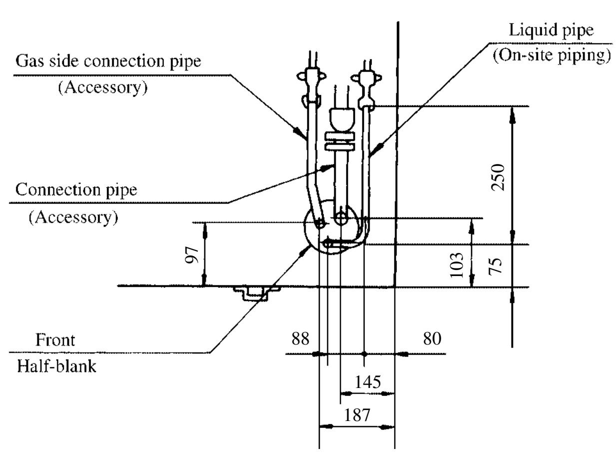
(c) How to connect piping

1) Connection to front directions.

a) Remove the front hall blank, pass through he hole the intake gas side, gas side and liquid pipes. and then connect then to the service valves and the on-site piping. (Because the liquid side pipe is on-site piping, bend it to the dimensions shown in the illustration at low.)

Unit : mm

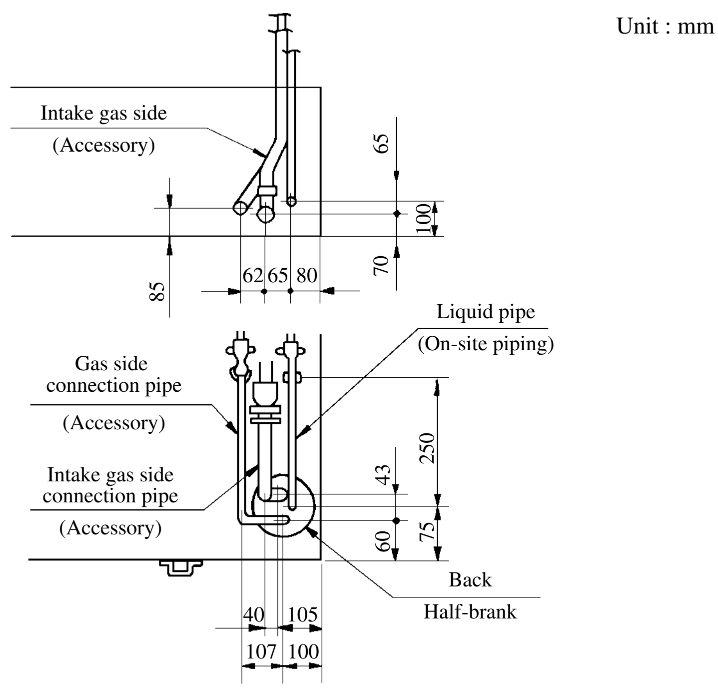




2) Connection to lower direction.

a) Cut off the accessory intake gas side connection pipe and then connect to the intake gas side atraight pipe.

b) Remove the back hall blank, pass through the hole the intake gas side, discharge gas side, and liquid pipes, and then connect them to the service valve and the on-site piping. (Because the liquid side pipe is on-site piping, bend it to the dimensions shown in the illustration at left.)

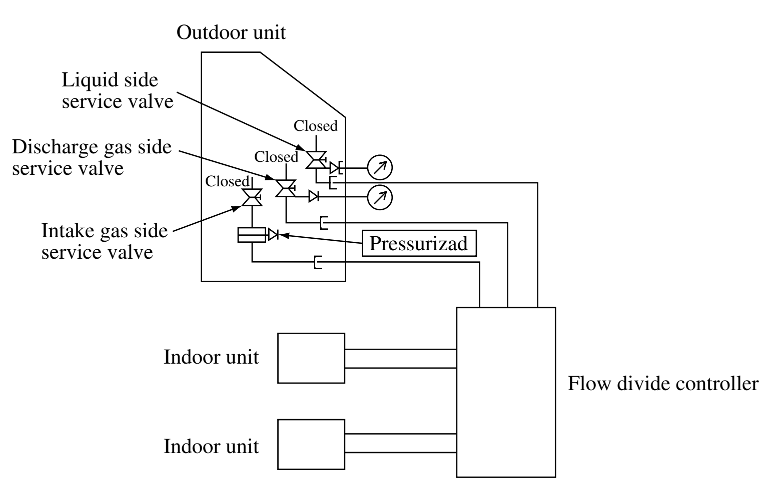


(4) Air-tight test

(a) The unit has already been hermelically lested by Mitsubishi Heavy lndustries, but after connecting the piping, hermelically test the connection piping and indoor units using the outdoor inlake gas side service valve check joint. Be sure to conduct the lest while the service valve is closed.
(Belore enlenring the lest, apply the power to the flow divide controller.)
Hermetic lest pressure : 3.3MPa

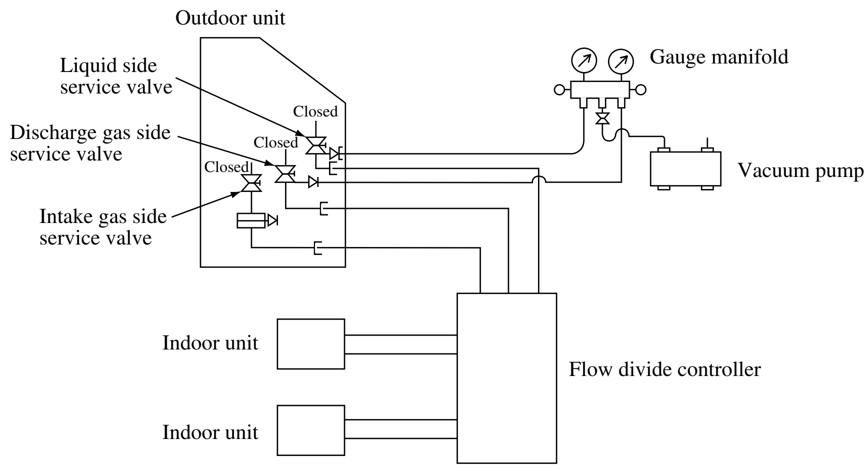
(b) Conduct nitrogen gas pressuriation from the intake gas side.

(c) After the hermetic lest, be sure to remove the vacuum from the discharge side.

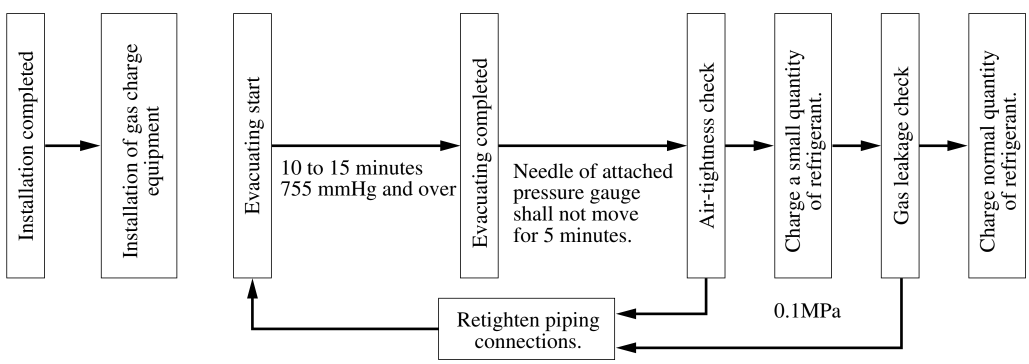


(5) Evacuating

Remove the vacuum from both the liquid side service valve check joint and the discharge gas side service value check joint.



<Work flow chart>



(6) Refrigerant charge amount

(a) Additional; charge amount

Item / Model	Additional charge amount per 1 m of liquid pipe			Factory charge amount at time of shipment	
	ϕ12.7	ϕ9.52	ϕ6.35	Outdoor unit	Remarks
FDCP224HKXRE2A 224HKXRE2V FDCP280HKXRE2A 280HKXRE2V	0.12 kg/m	0.06 kg/m	0.03 kg/m	11.0 kg	Additional refrigerant Charge is not required

Notes (1) When the refrigerant piping length exceeds the length that additional refrigerant charge is not required, charge additional refrigerant based on to calculated amount of refrigerant per unit piping length.

(2) The unit is holding charge type that all of the refrigerant is charged in the outdoor unit and in the indoor unit only a small amount of refrigerant is filled for prevention of the air entry.

Calculation of amount of refrigerant to be charged in local piping

The amount refrigerant additionally charged in local piping depends on connection pipe size but not on indoor unit type.

[Amount of refrigerant to be charged in the local piping = Actual length of liquid pipe × Amount of refrigerant additionally charged per meter of liquid pipe]

[Example] Amount of refrigerant additionally changed = (I_1 × 0.12) + (I_2 × 0.06) + (I_3 × 0.03)

I_1 : Overall length (m) of ϕ12.7 liquid pipe
I_2 : Overall length (m) of ϕ9.52 liquid pipe
I_3 : Overall length (m) of ϕ6.35 liquid pipe

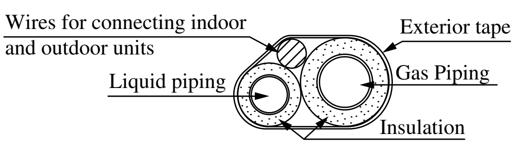
Following precautions must be observed when the model is adapted to R407C.

(1) Tools and related components should be changed when handling a different kind of refrigerant in order to prevent mixing of different oils. Gauge manifold and charge hose, particularly, should never be used after using them for R22.
(2) Charge cylinder should not be used. Otherwise, the refrigerant composition may change when charging R407C into the cylinder.
(3) Refrigerant should be charged in the liquid phase from the container. Charging the refrigerant in the gaseous phase could change the refrigerant composition substantially.
(4) Volume of refrigerant to be taken out in the liquid phase from the container should be up to 90% of necessary quantity (in weight percent) as a standard.
(5) Refrigerant should not be replenished even if a leakage is discovered because it could change the refrigerant composition substantially. When a leakage is discovered, replace with new refrigerant in the specified volume. However, it could be replenished temporarily in case of an emergency.

(7) Heat insulation

(i) There is a need to insulate both gas and liquid piping with heat insulation for protection against heat and condensation.

1) Always use heat insulation to prevent condensation on the gas piping from becoming drain water and causing leakage during cooling and to prevent people from being burned by the high temperature of the surface of the gas piping as discharge gas flows through it.
2) Use heat insulation (pipe cover) on the flare connection sections of the indoor unit. (Insulate both the gas and liquid piping.)
3) Insulate both the gas and liquid piping. Apply the insulation so that is tight against the piping and free of gaps. Route the connecting wires with the insulation and wrap the entire bundle with exterior tape.



※Use insulation material with good resistance heat properties (120 ˚C or more).

2.5.5 Electrical wiring

(1) Power supply wiring

(a) Outdoor unit power supply (A separate power supply is used for the indoor unit)

Model \ Item	Power supply	Power supply wiring thickness (mm²)	Wire length (m)	Wire circuit breaker (A) Rated current	Wire circuit breaker (A) Switch capacity	Short-circuit breaker (Use for both pround/ overload and short-circuit production)	Ground wire Thickness (mm²)	Ground wire Screw type
FDCP224HKXRE2A 224HKXRE2V	3-phase 380V 50Hz 415V 50Hz	5.5/5.5	46/54	40/40	30/30	40A100mA 0.1sec or less	5.5/5.5	M6
FDCP280HKXRE2A 280HKXRE2V		8.0/8.0	47/58	60/60	50/50	50A100mA 0.1sec or less		

(b) Indoor unit power supply

Supported outdoor model \ Item	Power supply	Power supply wiring thickness (mm²)	Wire length (m)	Thickness of power supply wire between indoorunits (mm²)	Circuit Breaker Switch luse capacity (A)	Wire circuit breaker rated current (A)	Short-circuit breaker (Use for both pround/ overload and short-circuit production)	Signal wire thikness (mm²) Between outdoor and indoor units	Signal wire thikness (mm²) Between indoor units
FDCP224HKXRE2A 224HKXRE2V	1-phase 220/240V 50Hz	2.0/2.0	37/37	2.0/2.0	20/20	20/20	20A30mA 0.1sec or less	2 core × 0.75 ~ 2.0	2 core × 0.75 ~ 2.0
FDCP280HKXRE2A 280HKXRE2V									

(c) Flow divide controller (Same power supply with the indoor units)

Supported model \ Item	Power supply	Power supply wiring thickness (mm² × number of wires)	Signal wire thickness (mm² × number of wires)
HPFD01R-E HPFD02R-E HPFD04R-E HPFD06R-E	1phase 220/240V 50Hz	2.0/2.0 × 2	2.0 × 3

(2) Precaution in electric wiring.

(a) Use separate power supplies for the outdoor and indoor units respectiveliy (Standard specification)

(b) Signal wiring (for indoor and outdoor units)

- Double-core cable with a diameter 0.75 to 2 mm2 should be used for the signal wires.
- **Never make the indoor and outdoor connecting signal line use "co-axial cable" or "strand" with the power wiring for indoor and outdoor unit and other ower line.**
  (Never use a multiconductor wire together with power line. It may cause erroneous operation.)
- Do not connect high voltage wires 220/240 V or 380/415 V to signal wires. as these wires are DC 5V. Signal wires should be connected so that the terminal Nos. conform with each other for between outdoor and between indoor units. However, they will work properly if different polarities are connected.
  (Connect (A) and (A), (B)and (B).)
- **Do not strand or run the remote control cord with power line, electric line, etc.**
- The total length of the signal wires Should be 1000m or less.

- **Recommended signal wire list**

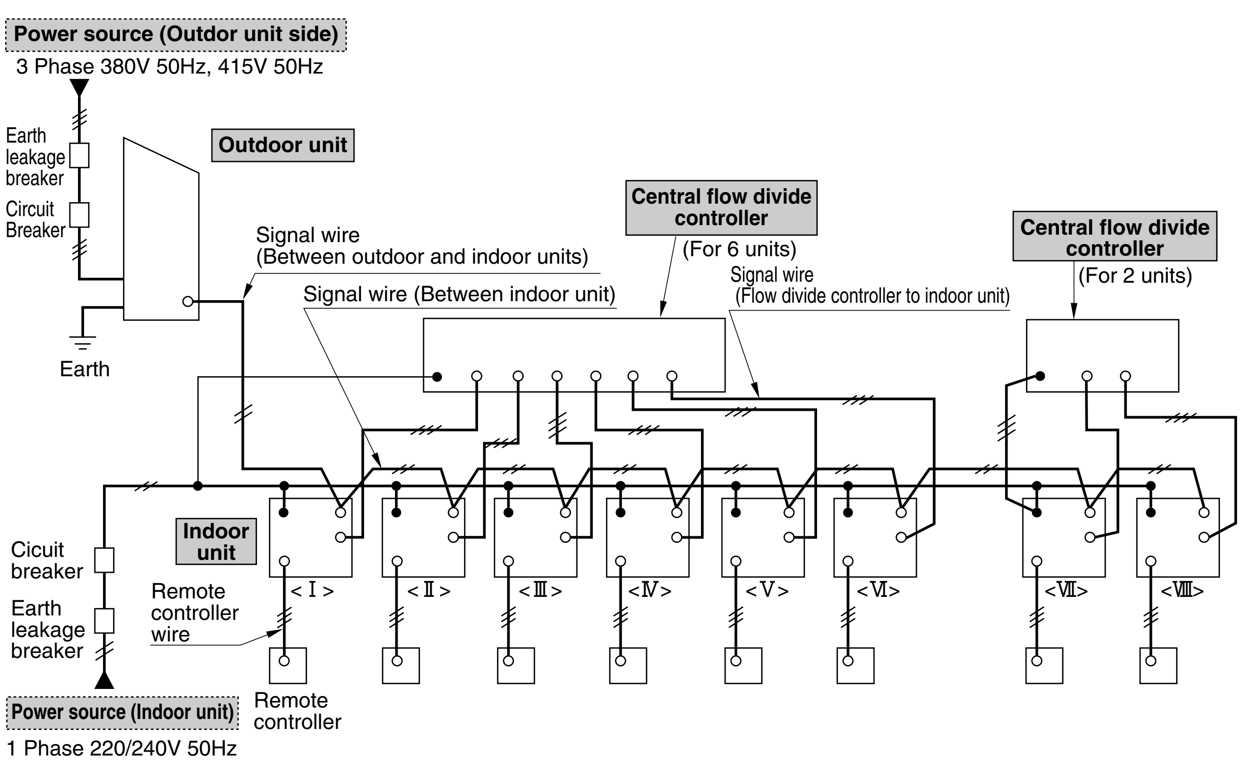
No.	Name	Symbol
1	Vinyl cabtire round cord	VCTF double-core 0.75 to 2 mm^2
2	Vinyl cabtire round cable	VCT double-core 0.75 to 2 mm^2
3	Control vinyl insulated, vinyl sheathed cable	CVV double-core 0.75 to 2 mm^2
4	Shielding wire	MVVS double-core 0.75 to 2 mm^2

When No. 4 shielding wire is used, always ground the single wire side of the shielding wire . In addition, using the shielding wire is helpful to prevent the incorrect connection between 5V DC and 220/240V or 380/415V AC because the discrimination from the power supply wire is clear.

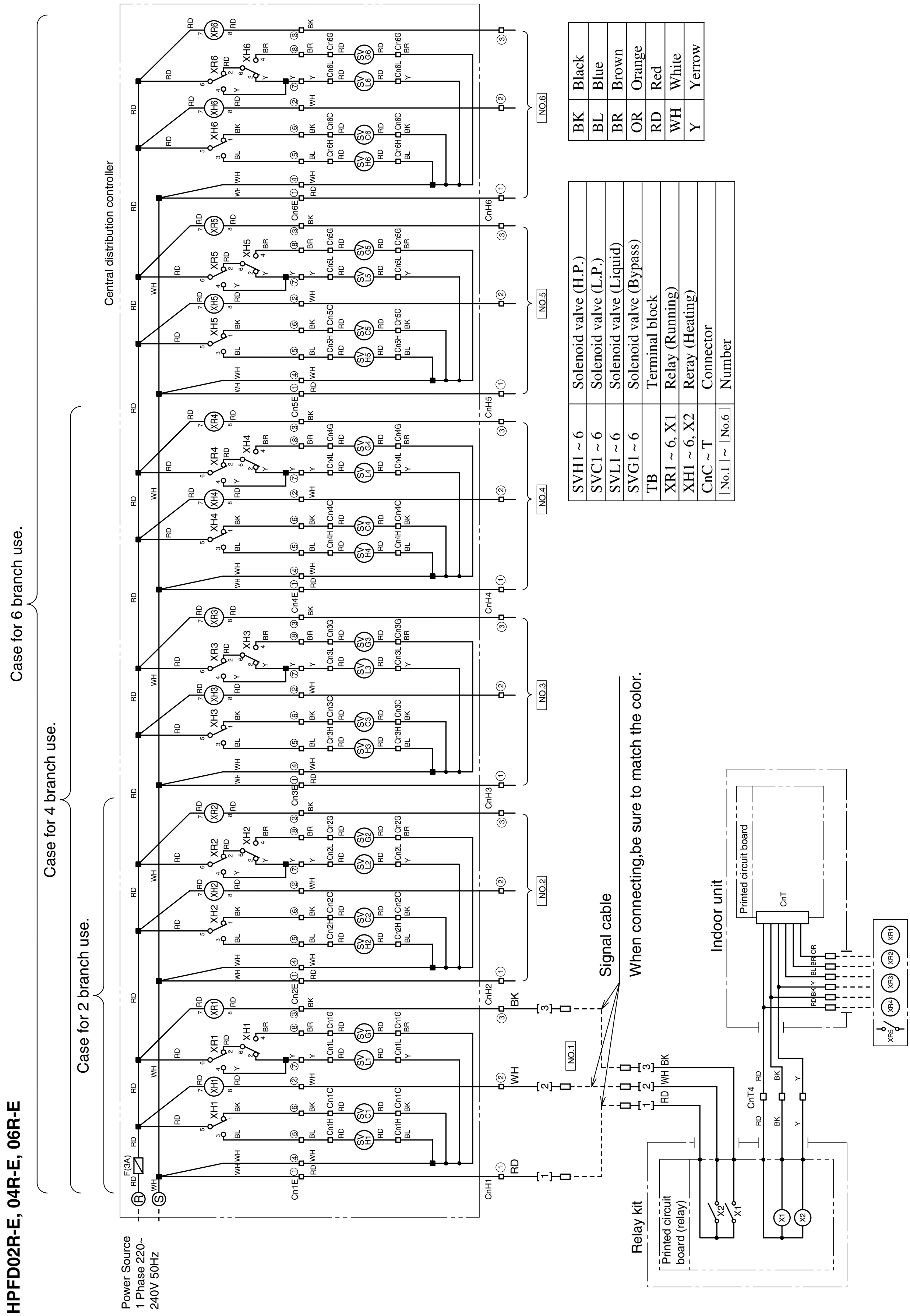
(3) Wiring system Diagram

(a) Central flow divide system

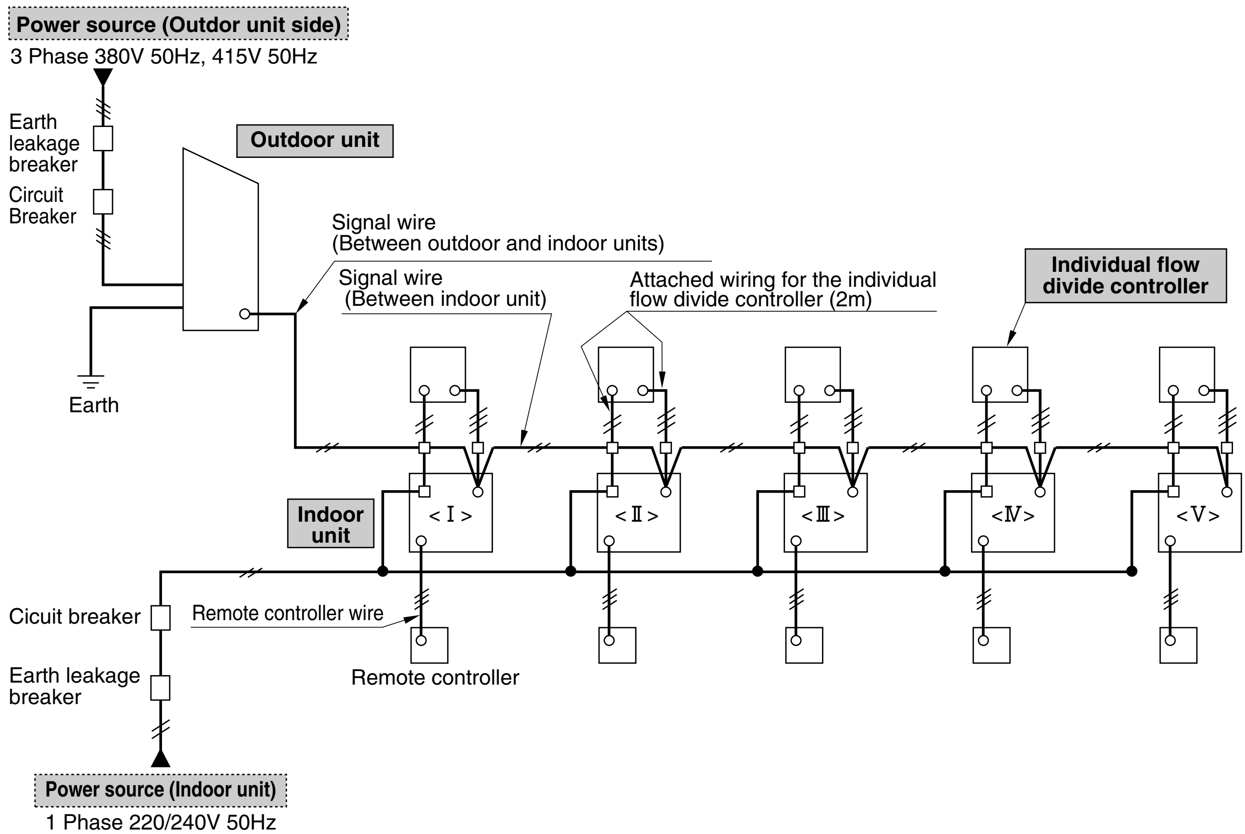
Note (1) Ensure to connect the signal wire from the indoor unit with the butt joint terminal of the same connection port number as the refrigerant pipe.



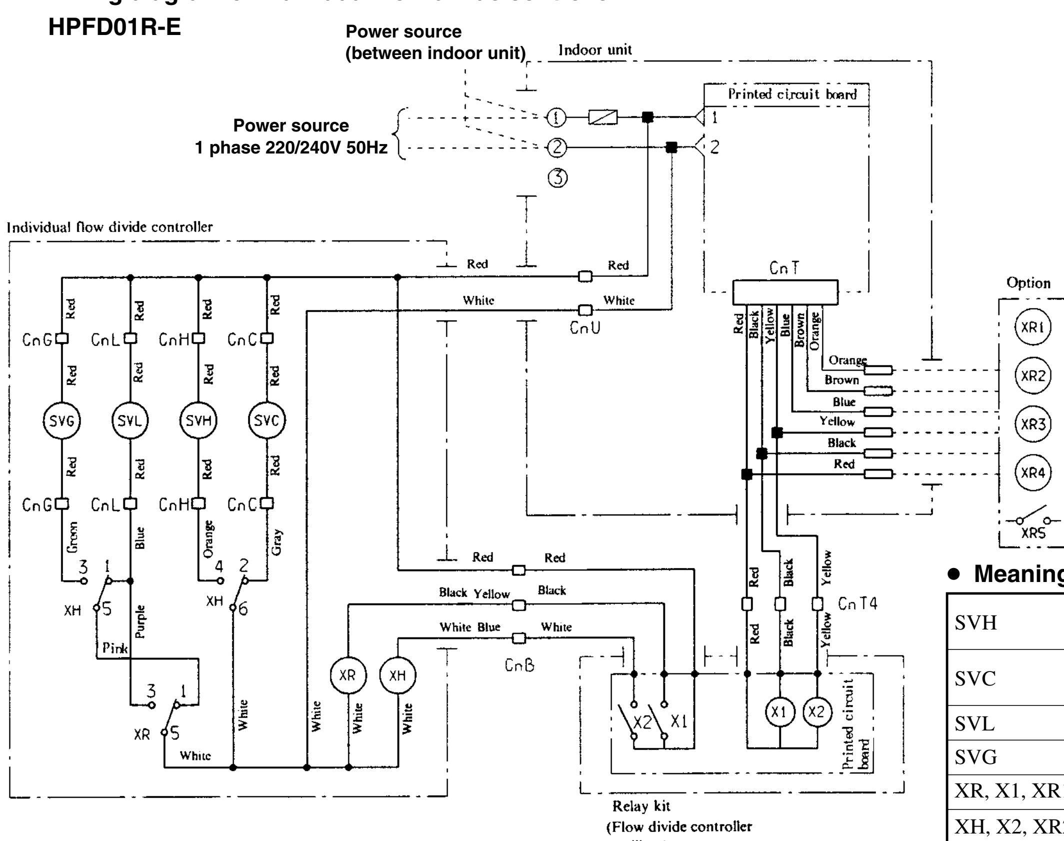
Wiring diagram of central flow divide controller



(b) Individual flow divide system



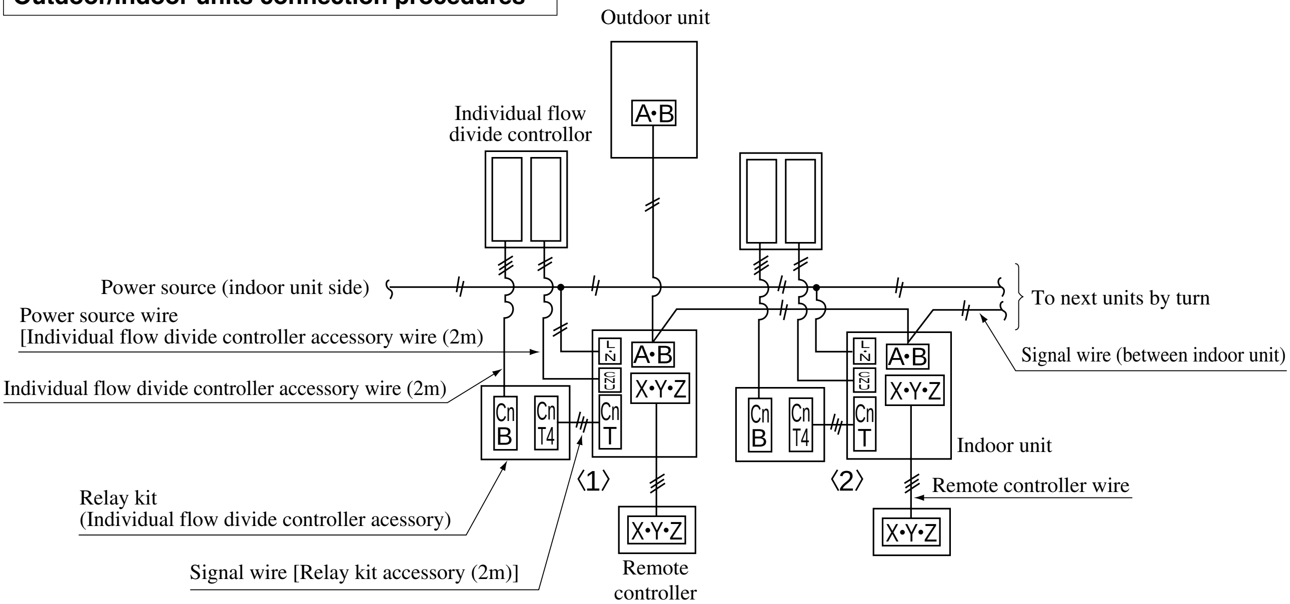
Wiring diagram of individual flow divide controller
HPFD01R-E



● Meaning of marks

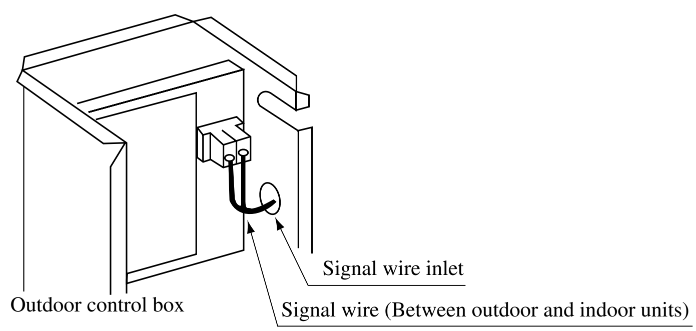
SVH	High-pressure gas solenoid valve
SVC	Low-pressure gas solenoid valve
SVL	Liquid solenoid valve
SVG	Bypass solenoid valve
XR, X1, XR1	Operation output
XH, X2, XR2	Heat output
XR3	Thermal ON output
XR4	Inspection output

Outdoor/Indoor units connection procedures



Signal wire

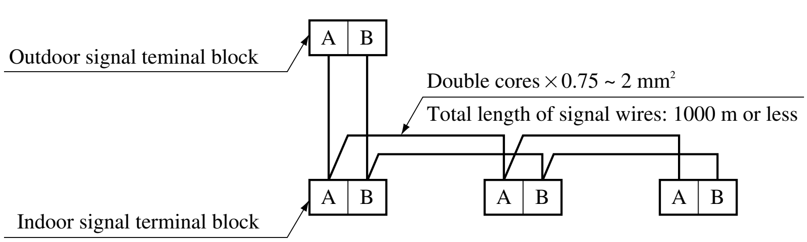
- Do not connect high voltage wire 380/415V to signal wires, as these wires are DC 5V. Signal wires should be connected so that the terminal Nos. conform with each other for between outdoor and between indoor units. However, they will work properly if different polarities are connected. (Connect (A) and (A), (B) and (B).)



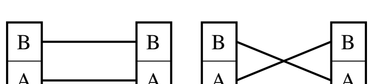
Be sure to let the signal wire get in through the signal wire inlet.

(4) Indoor and outdoor signal wiring

(a) If only one outdoor unit is used

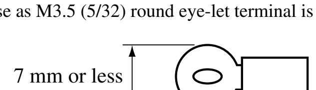


Notes (1) The indoor and outdoor signal wiring are without polarity



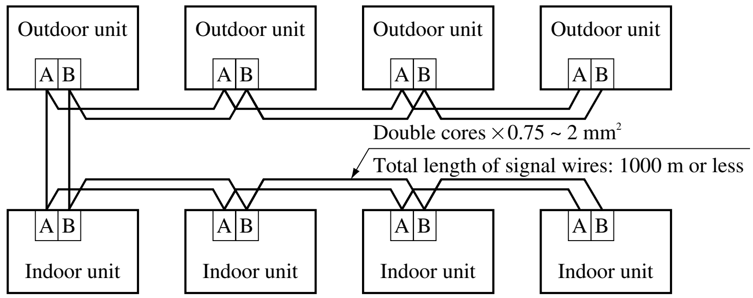
Either of the above wiring is correct.

(2) For connection to the terminal block, use as M3.5 (5/32) round eye-let terminal is shown below.

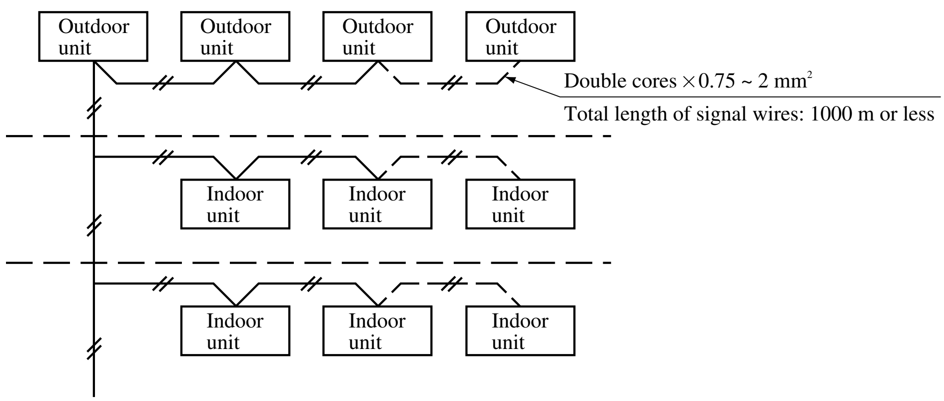


(b) If plural outdoor units are used

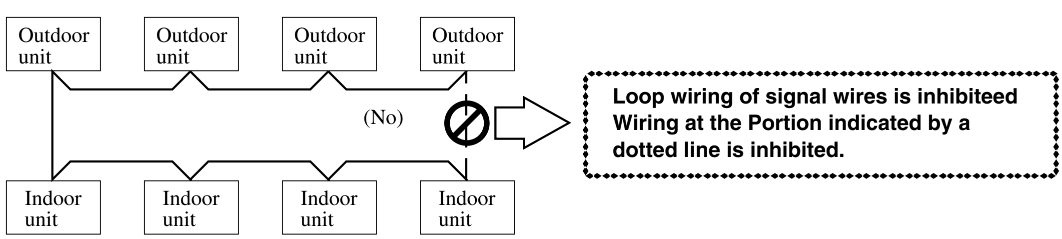
1) **A maximum of 48 indoor units can be connected by using the crossover wiring method, with 2 wires for each side of the outdoor and indoor units.**



2) **Indoor/outdoor wiring method for multiple floors.**

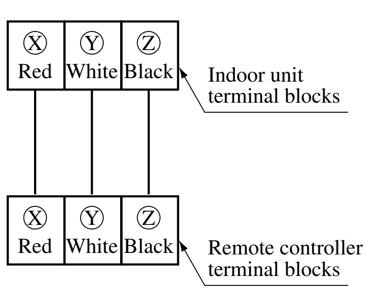


3) **Loop wiring is inhibited**



(5) Remote controller wiring

(a) Wiring for controlling only one indoor unit.



Note (1) Cables for the remote controller have polarity. Be sure to connect terminal blocks with the same numbers. If mis wiring occurs, E1 is displayed and disables the unit from operating.

(b) When controlling plural units.

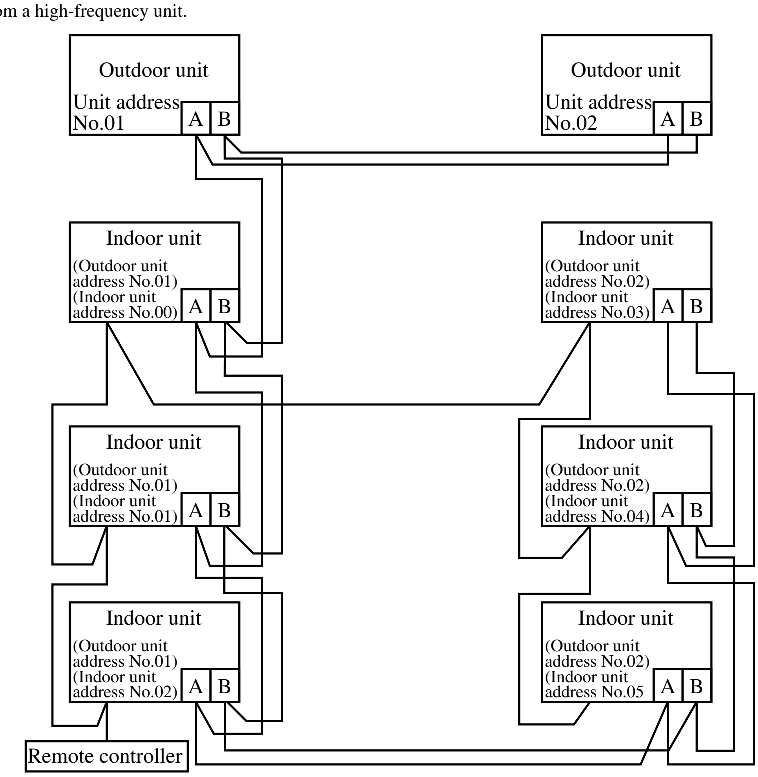
1) Use the same procedure shown in the drawing above for the wiring of the power supply, both indoor and outdoor units and remote controller
   When the wiring length for the remote controller exceeds 100 m, use the wiring procedure shown in the drawing below.
2) Connect each of the indoor units for group controlling (3 cables)
   a) Connect the cables to the terminal blocks of X, Y, and Z for the indoor unit remote controller. Since the cables have polarity, be sure to connect them to terminal blocks with the same numbers.
   b) Use cables of more than 0.5 mm2 (Flexible and easily moved)
   c) The total length of cables for crossover connection and the remote controller should be less than 600 m.

Allowable range of wire thickness and length

Standard Within	$0.3mm^2$	× Within 100m
	$0.5mm^2$	× Within 200m
	$0.75mm^2$	× Within 300m
	$1.25mm^2$	× Within 400m
	$2mm^2$	× Within 600m

3) When there is more than one outdoor unit, they can be controlled by one remote controller.
4) One remote controller is capable of controlling up to 16 units in group.

Note (1) Use shielded cables, when wiring in parallel with cables for other power supply or when there is a possibility of being affected by outer noise such as noise from a high-frequency unit.

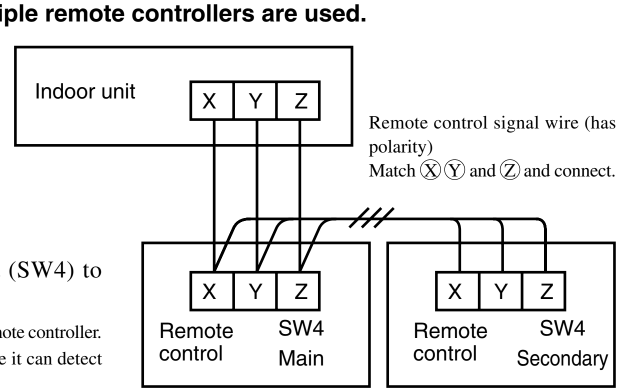


(c) Settings for main and secondary units when multiple remote controllers are used.

Up to two remote controllers can be used for each indoor unit (or each group of indoor units).

1) There are two methods for arranging this. One method is to take a remote control connection wire (3-strand) from the indoor unit for the secondary remote control. The other method is to use a jumper wire from the main remote control.
2) Set the remote control switch for the secondary unit (SW4) to secondary unit. (It was set to main unit a the factory.)

Note (1) The remote controller sensor setting is only enabled on the main remote controller. Be sure to position the main remote controller in a location where it can detect the room temperature.



(6) Setting of unit address

Addresses can be set either with the automatic address setting, remote control address setting or manual address setting depending on the combinations of address switches (see table) of the indoor and outdoor units. Operate the address switches before turning power on.

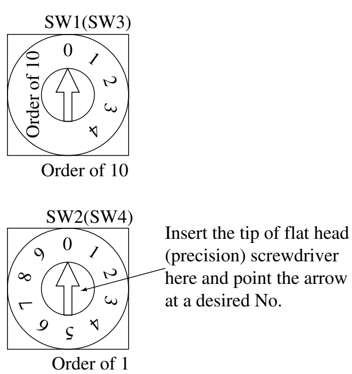
Address setting method	Outdoor unit	Indoor unit	
	Outdoor No.	Outdoor No.	Indoor No.
Auto address	49	49	49
Remote control address	00 ~ 47	49	49
Manual address	00 ~ 47	00 ~ 47	00 ~ 47

At the shipment from factory, outdoor Nos. of the outdoor unit are set at 49, both the output and indoor Nos. of the indoor units are set at 49 and the setting method is set for the automatic addressing.

Address No. setting

Set the setting SW1 - 4 on the indoor PCB and the setting SW1 and 2 on the outdoor PCB as listed below.

On indoor PCB	SW1, 2 (blue)	For setting of indoor No. (orders of 10 and 1)
	SW3, 4 (green)	For setting of outdoor No. (orders of 10 and 1)
On outdoor PCB	SW1, 2 (green)	For setting of outdoor No. (orders of 10 and 1)



		SW2 (SW4) Order of 1									
		0	1	2	3	4	5	6	7	8	9
SW1 (SW3) order of 10	0	00	01	02	03	04	05	06	07	08	09
	1	10	11	12	13	14	15	16	17	18	19
	2	20	21	22	23	24	25	26	27	28	29
	3	30	31	32	33	34	35	36	37	38	39
	4	40	41	42	43	44	45	46	47	48	49

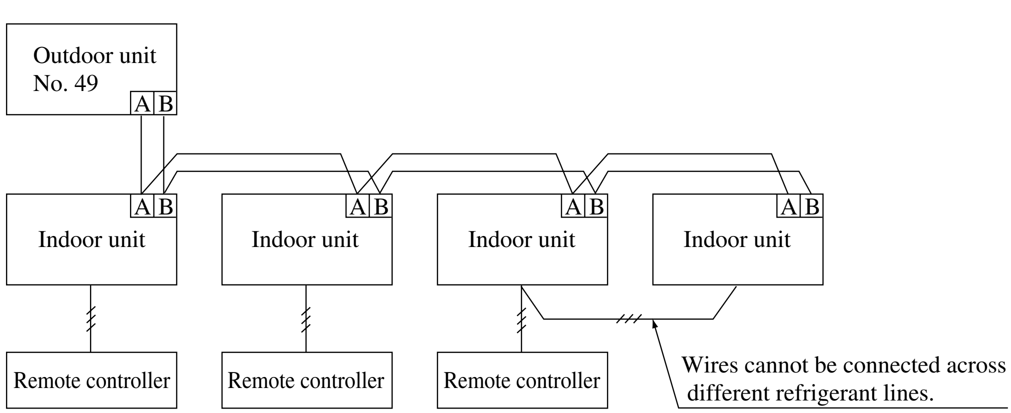
Use 48 and 49 for setting the auto or remote control address.

Notes (1) Outdoor No. is provided on the outdoor and indoor PCB's and indicates which outdoor unit is connected with which indoor unit via a refrigerant pipe. Indoor and outdoor units connected with a refrigerant pipe must have the same No.

(2) Indoor No. is used to identify a particular indoor unit. The No. should never be duplicated.

(a) Auto address setting

This setting is used when wiring on the basis of outdoor unit.



1) Set the address switch of outdoor unit at 49. (This is set at 49 at shipment from factory.)
2) Set the address switch of indoor unit at 49. (This is set at 49 at shipment from factory)
3) Turn power on for the indoor and outdoor units. Addresses are set automatically. (No. in a range of 0 - 15.)
   For the auto address setting, power must be ON for both the indoor and outdoor units. If power is supplied to the indoor unit only, "Outdoor No." is indicated on the remote controller. In such occasion, turn power ON also for the outdoor unit.
4) No. will be set within approx. 1 minute after turning power on.
5) If you press the inspection switch of the remote controller after setting the No., the address of indoor unit will be displayed. The outdoor unit No. 49 will also be displayed.
6) Auto address setting is allowed also when controlling plural number of units with single remote controller. However, the connection cannot be made across different refrigeration lines.

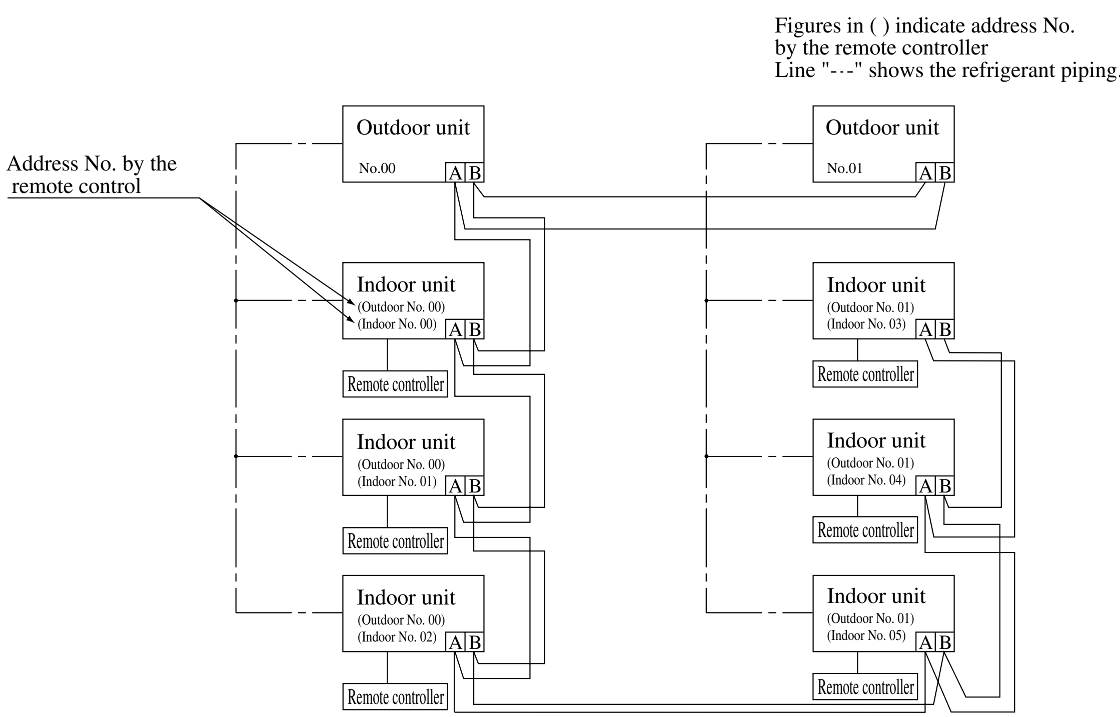
Information 1) Once addresses are set, they are retained on the microcomputer even after turning power off.
2) Even if the wiring is arranged on the basis of outdoor units, (2) remote control address setting and (3) manual address setting can be used.

○ Erasing of addresses set with the automatic address setting

On the remote controller, press the "Fan speed" switch while holding down both the switches "Check" and "Timer". Memory of address is erased. If the power supply to the indoor and outdoor units is turned off later, the system returns to the state of no address setting. Then one of the three address setting methods can be selected by changing combinations of the address switches.

(b) Setting of remote control addresses

This setting is used when connecting a plural number of indoor and outdoor units with the super link. This is applicable when using single remote controller.



1) Set the address of outdoor unit with a number in a range of 0 - 47 avoiding duplication with any other outdoor unit.
2) Leave intact the address switch on the indoor unit PCB at 49 as set at the shipment from factory.
3) Turn power on. Then you can proceed the remote control address setting.
4) Set the outdoor No. corresponding to each indoor unit, using the remote controller. Set next the indoor No. of indoor unit in a range or 0 - 47 avoiding duplication with any other unit connected in the group.

○ **Detail of setting from the remote controller**

1) If the power switch is turned on, the outdoor No. on the display flashes, and "--" on the return air temperature display section and "U--" on the time display section are lit.

   If power is not supplied to the outdoor unit, the outdoor No. only lights and you cannot set the address. In such occasion, to turn power on also for the outdoor unit.

2) Indoor No. increases 0, 1, 2, ... and up at each push on the room temperature setting ▲ switch. Press the room temperature setting ▼ to reduce the outdoor No. 0, 47, 46, 45 ... and down. Stop to press the switches when a desired No. is indicated.
3) Press the Set switch so that the outdoor unit display changes from flashing to firm lighting and the outdoor No. is set. Simultaneously, "U" indicating the indoor unit No. starts to flash.
4) Set the indoor No. in the same way with the room temperature setting switches ▲ and ▼.
5) After completing the setting, press the Set switch so that the "U" display changes from flashing to firm lighting and the figures of outdoor No. and indoor No. on display start to flash.
6) Confirming the outdoor No. and indoor No. being correct, press the Set switch again.

   If you like to change these Nos., press the "Check" switch so that it returns to the state of the step 2) and you can resume the address setting.

7) This is all for the address setting. The address display will go off 5 seconds later.

Note (1) Once the addresses are set, they are retained on the microcomputer even after turning power off. If you need to change the address, proceed as follows.

○ **Change of address**

Hold down the "Check" switch on the remote controller for more than 5 seconds. Outdoor No. on display flashes and you can set new addresses. Set the outdoor and indoor address Nos. same as described above. New addresses can be set.

○ **Erasing the addresses set by the remote control address setting**

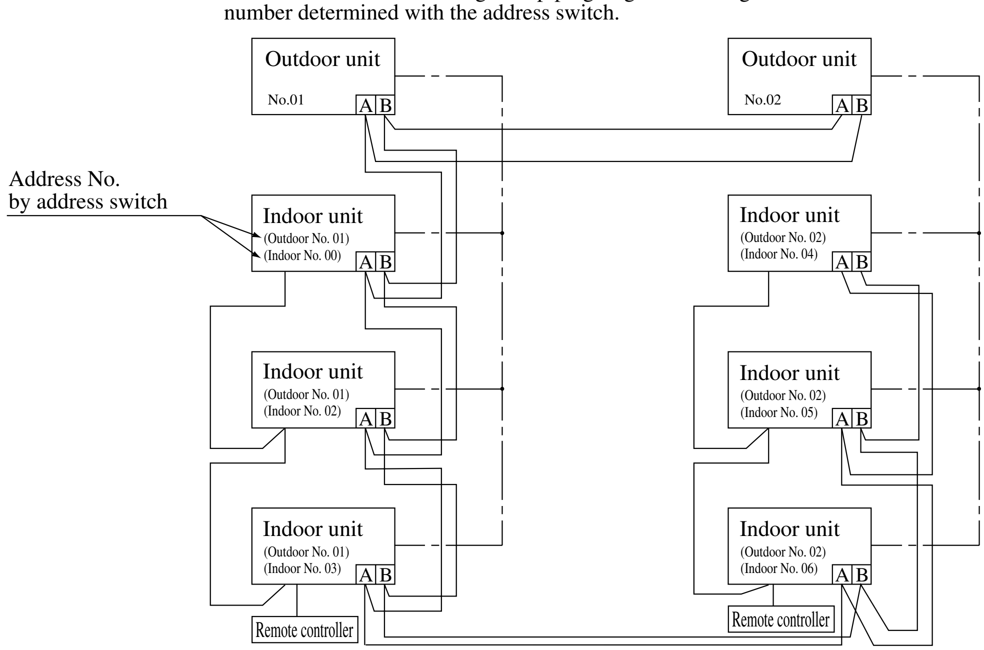
Holding down both the switches "Check" and "Timer", press the "Fan speed" switch. Addresses in the memory are erased. Turn power off on the indoor and outdoor units so that it returns to the no address setting condition and you can set the addresses with one of the three methods of address setting by changing combinations of the address switches.

(c) Manual address setting

This setting is used when connecting plural number of outdoor and indoor units with the super link, and is applicable when controlling with more than one remote controller. (You can use only one remote controller of course.)

○ Turn power off before operating the address switches. Change of address is disabled when power is supplied.

Line "-·-" indicates the refrigerant piping. Figure in the figure indicates the address number determined with the address switch.



1) Using the address switch (green) on the outdoor unit PCB, set the address of the outdoor unit in a range of 00 - 47 avoiding duplication with any other outdoor unit.
2) Using the address switch (green) on the indoor unit PCB, set the outdoor No. at the same No. as the outdoor unit which is connected with a refrigerant pipe.
3) Using the address switch (blue), set the indoor No. of indoor unit in a range of 00 - 47 avoiding duplication with any other unit on the connection.

2.5.6 Test run

(1) Before starting operation

(a) Measure resistances between the electrical parts terminal block and grounded area using a 500 V Megger, insulator. Resistance must be higher than 1 MΩ.

(b) Confirm whether the power source breaker (main switch) of the unit has been turned on for over 12 hours to energize the crankcase heater in advance of operation.

(c) Make sure that the compressor bottom has been warmed.

(d) Be sure to fully open the service valves (on both the gas and liquid sides) of the outdoor unit. If being operated without opening, the valve may be got out of order.

Note (1) When the service valve is closed, be sure to check that evacuation is completed or a refrigerant is charged.

(2) Test run

(a) If it is impossible, a test run of indoor units can be conducted by using the switches No. 4 and No. 5 of [SW3] on the outdoor unit circuit board irrespective of ON/OFF conditions of CnS and the remote controller.

No. 4 of [SW3] Test run ↕ Normal	• All connected indoor units operate when the switch is set to ON. • Indoor units request the maximum frequency and the outdoor unit operates with the maximum frequency shown in the table below according to requests from indoor units. • Select cooling or heating according to input to No. 5 of [SW3].	• When the switch is set to OFF, these units can be operated with the remote controller or by external input.
No. 5 of [SW3]	• Turn this on makes it possible to conduct cooling operation when [SW3] No. 4 is turned on.	• Turning this off makes it possible to conduct heating operation when [SW3]'s No. 4 is turned off.

[Remark]

This operation has priority over other option commands with the center console.

At the time of trial operation, the maximum frequencies are follows. Protective devices are effectively controlled, and frequencies are controlled to become smaller.

Models	FDCP224HKXRE2A 224HKXRE2V	FDCP280HKXRE2A 280HKXRE2V
Maximum frequency for operation (Hz)	95	95

(b) The frequency for operation can be monitored with yellow LEDs on the indoor unit circuit board. Relations between LED lighting condition and frequency are as follows.

Inverter frequency monitor

LED3	○	○	○	○	-●-	-●-	-●-	-●-
LED4	○	○	-●-	-●-	○	○	-●-	-●-
LED5	○	-●-	○	-●-	○	-●-	○	-●-
Operation frequency	0 ~ 35	35 ~ 45	45 ~ 55	55 ~ 65	65 ~ 75	75 ~ 85	85 ~ 95	95 ~ 110

CAUTION: After end of a test run order, set No. 4 of [SW3] to OFF

Notes (1) -●- mark: Flashing

○ mark: Stays OFF

(2) Relation between LED3 ~5 and operation frequency

- LED3 ...... 40 Hz
- LED4 ...... 20 Hz
- LED5 ...... 10 Hz
- Operation frequency = Frequency indicated by LED3 ~ 5 + 25

(3) Cooling test run operation (Cooling test run can be performed in winter.)

(a) Operation method

- In the normal cooling mode, hold down the “Temperature Set” switch while pushing the “Set” switch.
- Setting temperature is changed at 5˚C and the cooling test run is operated for 30 minutes.
  It stops after 30 minutes.

(b) During cooling test run operation

- If ON/OFF switch is pressed or a mode other than the cooling is selected by the “Mode” switch, the cooling test run operation is released or returns to the specified operation mode.
- If the “Temperature set” switch is pressed, the setting temperature changed at 18˚C and the cooling test run operation is released but the cooling operation continues.
- It is effective when any switches other than the above are pressed.

(c) During the cooling test run operation, the setting temperature changed at 5°C but any other control and protective functions are operable just like in the normal operation.

- If any error occurs, the location of error is indicated on the remote controller display or with the condition of flashing of inspection lamp (red) on the main unit controller. Remove the cause of trouble before starting operation again.

(4) Delivery

(a) Explain how to operate the indoor unit to your customer according to the accessory owner’s manual.

(b) Persuade the customer not to turn off the power switch even if the unit is not used for along time. The air conditioner can start operation any time when your customer want to heating or cooling his room. (The bottom of the compressor is heated with the crank case heater, and compressor troubles can be prevented when the cooling or heating season sets in.)

2.6. MAINTENANCE DATA

2.6.1 Diagnosis of Microcomputer circuit

(1) Confirmation of the error code on the remote controller (by pressing the inspection switch) and the inspection display and normal display lamps on PCBs of indoor/ outdoor units

The microcomputer detects errors on electrical components, whitch include the microcomputer itself, errors on the power supply line and errors (overload, etc.) on the refrigerant circuit and the location of trouble is displayed (with the combination of error symbols of remote controller, normal (green) and inspection (red) display LED on PCBs of indoor/outdoor units.) When any error occurs, check first the inspection display. It will guide you to the trouble point and assist you to complete the repair work quikly.

Error code of the remote controller is recorded on the microcomputer after the trouble has been reset automatically so that, if you press the inspection switch of remote controller, the error code and the number of unit in trouble are displayed for 10 sec., The inspection display lamp on the indoor/outdoor unit PCB keeps flashing (glowing) even after the trouble was reset automatically.

Inspection lamp on the indoor unit PCB is turned off if the remote controller is reset.

1) Inspection / normal: List of power display

Section	Display section	Display	Contents of display
Remote controller	Power supply display	LCD	At power ON: Displays always the return air temperature and Center/ Remote.
	Error code	LCD	At error: Displays E1 ~ E46 or blank depending on the kings of error.
	Inspection display	Red-LED	At error: Flash continuously (indicates the occurrence of error).
Indoor/outdoor unit	Normal display	Green-LED	At power ON (normal): Flash continuously. At error: Off or continuous glowing or irregular illumination.
	Error display	Red-LED	At error: Flash 1 ~ 3 times/ 5 sec for indoor unit depending on the kinds of error, continuous flash, irregular illumination or off. At error: Flash 1 ~ 9 times/ 10 sec for outdoor unit. depending on the kinds of error, continuous flash, irregular illumination or off.
Inverters	Normaly display	Green-LD1	At power ON (normal): Flash continuously At error: off or continuous glowing or irregular illumination.
	Error display	Red-LD2	At error: Lights when the power transistor overheats (for 3 minutes or more).
		Red-LD3	At error: Lights upon occurrence of a current-cut (held for 3 minutes).
		Red-LD4	At error: Lights when a transmisson error occurs between outdoor unit inverters.

2) Check Indicator Table

Whether a failure exists or not on the indoor unit and outdoor unit can be known by the contents of remote controller error code, indoor / outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
No-indication	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Normal
	Stays OFF	Stays OFF	Stays OFF	Stays OFF	Power OFF, L3 phase wiring is open, power source failure
	Keeps flashing	3 time flash	Keeps flashing	Stays OFF	Remote controller wires X and Y are reversely connected.* For wire breaking at power ON, the LED is OFF. Remote controller wire is open. (X wire breaking: A beep is produced and no indication is made. Z wire breaking: No beep and no indication) The remote controller wires Y and Z are reversely connected. (32-sec time flash)
E1	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	The remote controller wires are connected to A and B on the terminal block. The indoor/outdoor signal wire are connected in loop form. The indoor unit microcomputer runs away.
	Stay OFF or Lights continuously	Stay OFF or Liglits continuously	Keeps flashing	Stay OFF	Indoor unit PCB fault
	Keeps flashing	3 time flash	Keeps flashing	Stays OFF	Remote control wire breakage (signal) *Unlit for wire breakage when power is on.
E2	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	No. duplication at indoor unit addressing. More than 49 indoor unit are connected.
E3	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor unit power supply OFF (detected only during operation)
	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	The corresponding outdoor unit address No is not found. (Detected only during opreation) Indoor/outdoor signal line wire breaking Indoor unit PCB fault.
E5	Keeps flashing	2 time flash	Keeps flashing	6 time flash	Indoor/outdoor transmission error. Wire A and B swapping after power ON.
	Keeps flashing	2 time flash	Stay OFF or Lights continuously	32-sec time flash	Outdoor unit microcomputer failure
	Keeps flashing	2 time flash	Stays OFF	Stays OFF	Outdoor power unit failure (When the indoor power supply is different from the outdoor one.)
E6	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit heat exchanger thermistor failure
E7	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit return air thermistor failure
E9	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	The float SW operates (with FS only). Drain up kit wiring fault.
E10	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	When multi-unit control by remote controller is performed, the number of units is over (more than 17 units). Two remote controllers are provided for one controller is performed.
E11	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote controller addresses have been set while more than one units of remote controller are connected.
E12	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Address No. combination error or addressing is performed with the following combinations. Outdoor No, / Indoor No, 0 ~ 47 / 48, 49 48, 49 / 0 ~ 47
E28	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote controller thermistor failure

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
E31	Keeps flashing	Stays OFF	Keeps flashing	8 time flash	Outdoor unit No. duplication. Outdoor unit address No. is not set for super lynk wiring. Outdoor unit address No. is changed in the power ON status.
E34	Keeps flashing	Stays OFF	Keeps flashing	2 time flash	52C secondary side L3-phase wiring is open. Inverters error.
E36	Keeps flashing	Stays OFF	Keeps flashing	5 time flash	Discharge temperature abnormality.
E37	Keeps flashing	Stays OFF	Keeps flashing	Keeps flashing	Outdoor unit heat exchanger thermistor failure
E38	Keeps flashing	Stays OFF	Keeps flashing	Keeps flashing	Outdoor temperature thermistor failure
E39	Keeps flashing	Stays OFF	Keeps flashing	Keeps flashing	Discharge temperature thermistor failure
E40	Keeps flashing	Stays OFF	Keeps flashing	3 time flash	63H1 operation
E41	Keeps flashing	Stays OFF	Keeps flashing	4 time flash	Power transistor overheat
E42	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Abnormal current cut of compressor
E43	Keeps flashing	Stays OFF	Keeps flashing	7 time flash	The number of connectable units is exceeded.
E45	Keeps flashing	Stays OFF	Keeps flashing	9 time flash	Transmission error between inverter and outdoor unit PCB
E46	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Automatic address and remote controller address or manual address coexists in the same network.

3) Display sequence of error, inspection display lamp

a) One kind error

Display corresponding to the error is shown.

b) More than one errors.

Section	Display section
Error code of remote controller	• Displays the error of higher prority (When plural errors are persisting.) E1>E10>E11>E2>E3>E5>E7>E9>E6>E12 •••••• E46
Inspection LED(red) of indoor unit PCB	
Inspection LED (red) of outdoor unit PCB	• Displays the present errors. (When a new error has occurred after the former error was reset.)

c) Timing of error detection

• Indoor unit side.

Error detail	Error code	Timing of error detection
Transmission error of remote controller indoor unit	E1	When the transmission error continuously for 2 min.
CPU is out of control		Resetting was performed at the rate of 1 time per second. An abnormal stop occurred 32-sec time flash.
Transmission error between indoor/outdoor units	E5	A check was made once every 20 second. An abnormal stop occurred 7 time running.
Broken wire of heat exchanger thermistor	E6	After a compressor ON command, this failure was detected for 5 second in the period of 2 minutes to 2 minutes and 20 seconds.
Broken wire of indoor unit return air thermistor	E7	This failure was detected continuously for 5 seconds.
Drain error(float switch motion)	E9	At the thermostat ON state, an abnormal stop occurred immediately after the float switch operated. - At a stop or the thermostat OFF state, the condensate motor was turned on for 3 minutes after the float switch operated. After that, an abnormal stop occurred when the float switch operated in 10 seconds.

• **Outdoor unit side**

Error detail	Error code	Timing of error detection
52C secondary side L3-phase wiring is open.	E34	An abnormal stop occurs when the L3-phase voltage is 0 V for 5 seconds running. (Detected with 52C ON only)
Discharge temperature abnormality	E36	A stop occurs when this abnormality occurs for 2 seconds running at 130°C After a stop for 3 minutes, an recovery is automatically made. An abnormal stop occurs when this abnormality occurs twice for 60 minutes. (The abnormal state is held for 45 minutes.)
Broken wire of heat exchanger thermister	E37	This failure is detected when it occurs for 5 seconds running in the period of 2 minutes to 2 minutes and 20 seconds with the compressor ON. An abnormal stop occurs when this failure occurs 3 times for 40 minutes.
Broken wire of outdoor temperature thermister	E38	
Broken wire of discharge thermister	E39	This failure is detected when it occurs for 5 seconds running in the period of 10 minutes to 10 minutes and 20 seconds with the compressor ON. An abnormal stop occurs when this failure occurs 3 times for 40 minutes.
Hight pressure cut	E40	An abnormal stop occurs when this abnormality occurs 2 times for 40 minutes.
Power transistor overheat	E41	A stop occurs at 90°C or more. After 3 minutes, a recovery was automatically made at 83°C or less. Abnormal stop occurs when this abnormality occurs 2 times for 2 hours.
Current cut	E42	An abnormal stop occurs when this abnormality occurs 4 times for 15 minutes.
Excessive number of outdoor units	E43	This error is detected when the number of connectable units is set over the specified value at remote control addressing.
Transmission error between inverter and outdoor unit PCB	E45	When an transmission error continues for 10 seconds, the 52C is turned off. With a delay of 3 minutes, a recovery is automatically made. An abnormal stop occurs when this error occurs 4 times for 15 minutes.

d) Recording and reset of error

Error display	Memory	Reset
Error code	• Saves in memory the mode(1) of higher priority	• Stop the unit operation by pressing the ON/OFF switch of remote controller. • Operation can be started again if the error has been reset.(2)
Indoor unit inspection lamp (red)	• Cannot save in memory	
Outdoor unit inspection lamp (red)	• Saves in memory the mode(1) of higher priority	

Notes (1) Priority is in the order of E1 > ... > E10 > ... > 45.
(2) Reset is disabled for 45 min. at the error of outdoor unit or compressor overcurrent or the discharge gas temperature error.

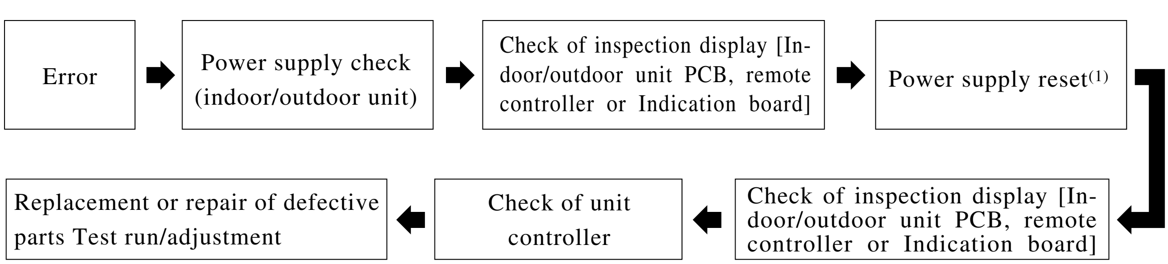
e) Reset of error code in memory (when the error has been reset.)

Indoor unit: Press the Timer switch and the Stop switch while the Inspection switch of wired remote controller is held down or detach the power supply connector (CnW_2) of indoor unit PCB and connect again or turn OFF the power.

Outdoor unit: Detach the power supply connector (CNA_2) of outdoor unit PCB and connect again or turn OFF the power supply or turn on and off the SW3-1.

(2) Procedures of trouble diagnosis

When any error occurs, inspect in following sequence. Detailed explanation on each step is given later in this text.

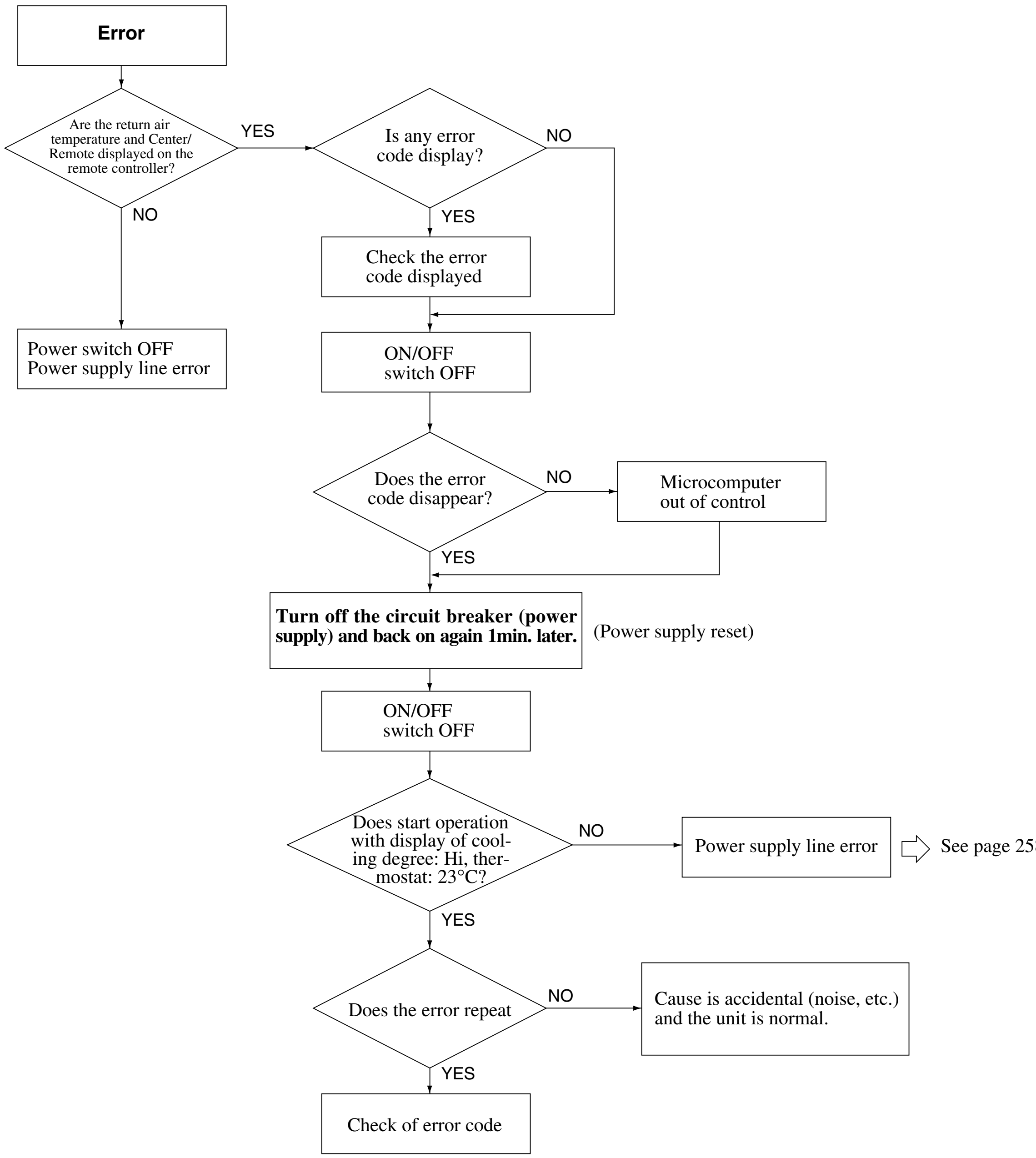


Note (1) It means the operation to turn off the power and back on again more than 1 min. later in order to reset the malfunction of microcomputer due to the effect of power supply conditions or accidental noise.

(a) Diagnosis by the power supply reset

When any error occurs, reset the power supply as described below to see if it is the result of accidental noise, etc.

▶ Check at the indoor unit side.



Errors due to external noise, etc.

Error code may be displayed or the error may not be displayed normally even if the controller is normal because of external noise source(1) or joined or parallel arrangement of power cables and signal wires. It is because the wire of remote controller, wired remote controller signal wires for multiple units or the network signal wires may be influenced by external noises whitch are judged as signals by the microcomputer whitch reacts mistakenly.

When there is any noise source, it is necessary to the shield wire for the remote controller and signal wires.

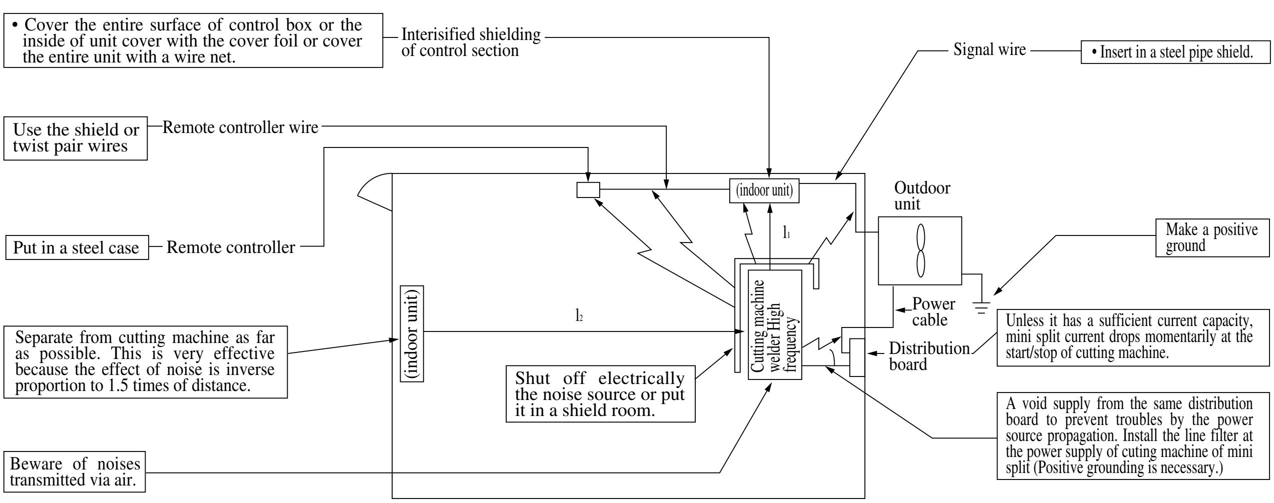
Note (1) High frequency medical machine, rectifier motor application device, thyristor, broadcast transmission tower, power transmission line, power line of electric train, automatic door motor, elevator (voltage drop), wireless telephone, high voltage power distribution line, computer, personal compouter and their cables.

There do not necessarily always cause problems but they can be a source of electrical noise.

(2) Reference Effect of noise

- When noises inturude into remote controller.
  Abnormal or irregular display such as the flashing of irrelevant display (lamp) (for example, LEDs of cooling and heating illuminated simultaneously or the like) is observed even if the remote controller is not operated or the remote or the remote controller and, as the result, the operation of units may be disabled or similar abnormal phenomenons are observed.
- When noises intruded into the microcomputer of printed circuit board; State of operation becomes abnormal such as the units perform irregular operation while the remote controller is not operated, the operation cannot be stopped with the remote controller, etc.

Electro magnetic noise prevention (example)



(b) Error diagnosis procedures at the indoor unit side

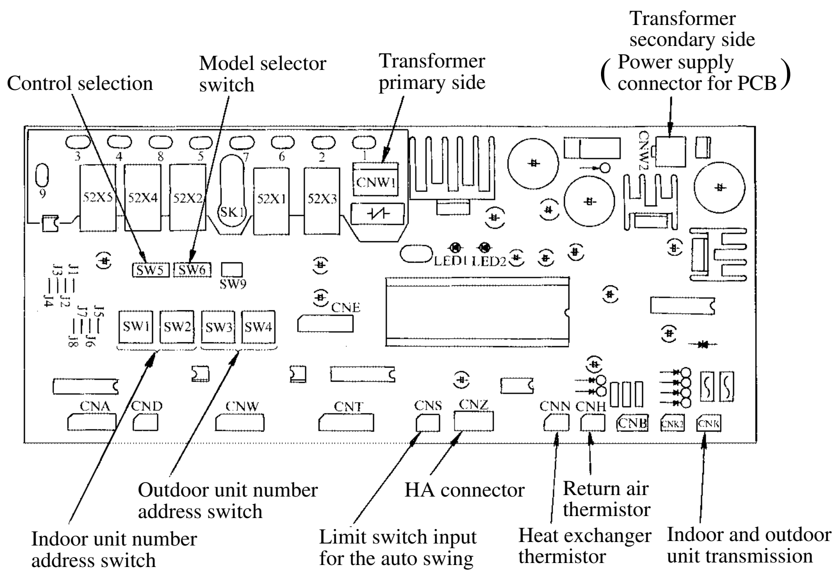
To diagnose the error, measure the voltage (AC,DC), resistance, etc. at each connector around the printed circuit board of indoor unit PCB on the inspection display or the operation state of unit (no operation of comressor or blower, no switching of 4-way valve, etc.). If any defective parts are discovered, replace with the assembly of parts as shown below.

(i) Unit of replacement parts releated to indoor unit printed circuit board (Electric components on and around the microcomputer)

Indoor unit printed circuit board, thermistor (Return air, heat exchanger), remote controller switch, limit switch, transformer, fuse

Note (1) Judges the troubles on the parts of driving power circuit or cooling cycle with the ordinary check method.

(ii) Parts layout on the indoor unit printed circuit board



- Function of jumper wires

Name		Function
J1	With	Setting of 4 position angle of louver
	None (1)	Setting of 4 position angle of louver
J2	With	4 position louver control : Valid
	None (1)	4 position louver control : Invalid
J3	With	Heating thermostat OFF - Intermittent operation
	None (1)	Heating thermostat OFF - Stop
J4	With	Filter sign : Valid
	None (1)	Filter sign : Invalid
J5	With	Normal operation operable
	None (1)	Operation permission prohibited
J6	With	Expansion valve aperture - Fixed at current aperture.
	None (1)	Expansion valve aperture - Fixed at new aperture.
J6 (2)	With	Automatic detection of expansion valve aperture opening (only for J71, 90)
	None (1)	Expansion valve aperture - Fixed at new aperture.(except J71, 90)
J7	With	Expansion valve aperture - Normal
	None (1)	Impossibility
J8	With	Spare
	None (1)	Spare

Note (1) "None" means that jumper wire is not provided on the PCB or the connection is cut.
(2) Only FDT series has the following control.

- **Replacement procedure of indoor unit mircrcomputer printed circuit board**

Microcomputer printed circuit board can replaced with following procedure.

1) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

Parts No.	Model
PJA505A073ZA	FDR, FDUM, FDK, FDFL, FDFU
PJA505A074ZA	FDT, FDTW
PJA505A078ZA	FDTQ, FDTS, FDQM, FDE

- Model select switch (SW6)

Switch \ Model	22	28	36	45	56	71	90	112	140
SW6-1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW6-2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF
SW6-3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF
SW6-4	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

- Function of DIP switches

Switch		Function		Reference page
SW5-1	ON	Input Signal	Reverse Invalid	153
	OFF		Rus stop	
SW5-2	ON	Heating temp. shift + 3		150
	OFF	Normal		
SW5-3	ON	Test run of condensate pump motor		151
	OFF	Normal		

(iii) Check method when the error code is displayed

Remote controller or Indication board: Inspection LED, error code

Indoor unit PCB: Red LED (inspcetion display), Green LED (CPU. normal display)

Outdoor unit PCB: Red LED (inspcetion display), Green LED (CPU. normal display)

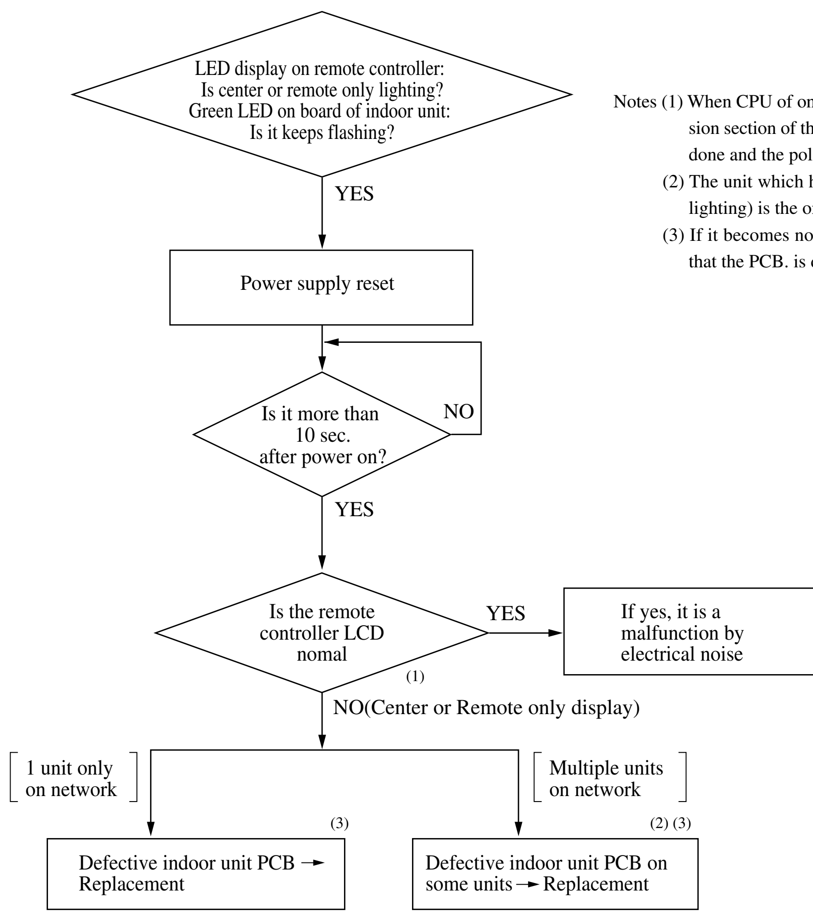
(iv) Check procedure depending on indication lamps (For the indoor unit)

The next page error diagnosis is applicable to cases where only 1 unit is installed in a network unless stated otherwise but the check method is same even if there are multiple units on the network. Except the network occupation state due to out of control indoor unit CPU, the error display indicates the state of respective units. Check each unit specified by the error display as explained on next page.

1	Error display : No display LCD display : No display	[Polarity determination trouble]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

- When the LCD display (Center/Remote, temperature display, etc.) of remote controller flashes, it means the polarity on the unit is not yet determined. Polarity determination is completed within a few seconds after the power on. If it is not completed in time, CPU out of cotnrol, etc. is suspected.



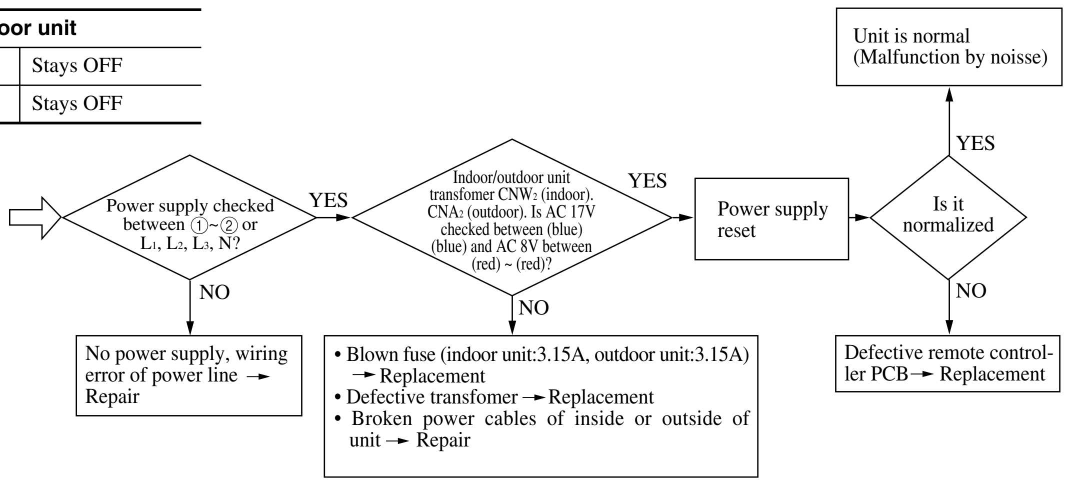
Notes (1) When CPU of one unit goes out of control, it occuping the transmission section of the network, so the transmission of other units are not done and the polarity of the whole network will not be determined.
(2) The unit which has its indoor and green LED keeps flashing (or no lighting) is the one with a defective indoor unit PCB.
(3) If it becomes normal after replacing the PCB. it can be considered that the PCB. is defective (defective network transmission circuit).

2 Error display : No display / LCD display : No display

[Power supply line error]

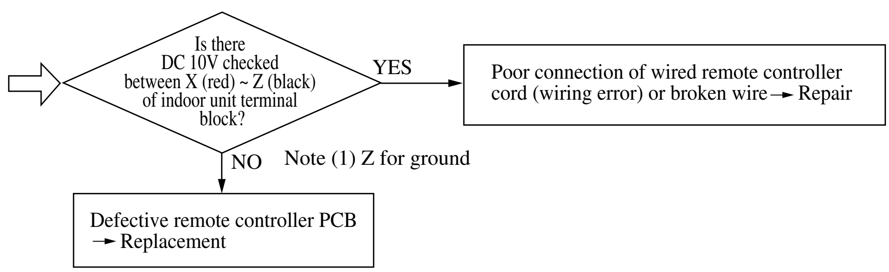
Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF

Indoor unit	
Red LED	Stays OFF
Green LED	Stays OFF



Indoor unit	
Red LED	*3 time flash (During unit operation)
Green LED	Keeps flashing

Flash of green LED means CPU is normal.
* If the remote controller wire is broken at the power ON, it does not illuminate.

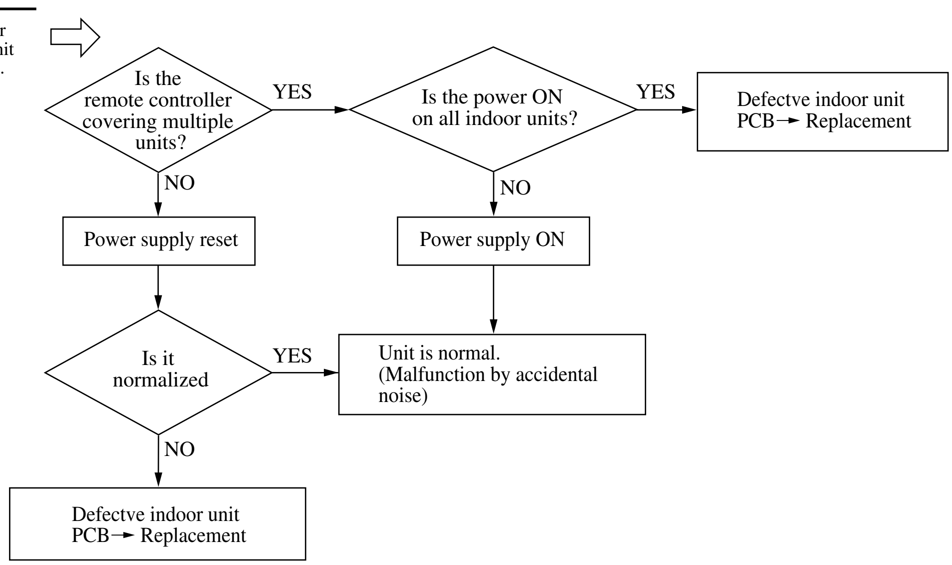


3 Error display: E1

[Communication error between remote controller~Indoor unit]

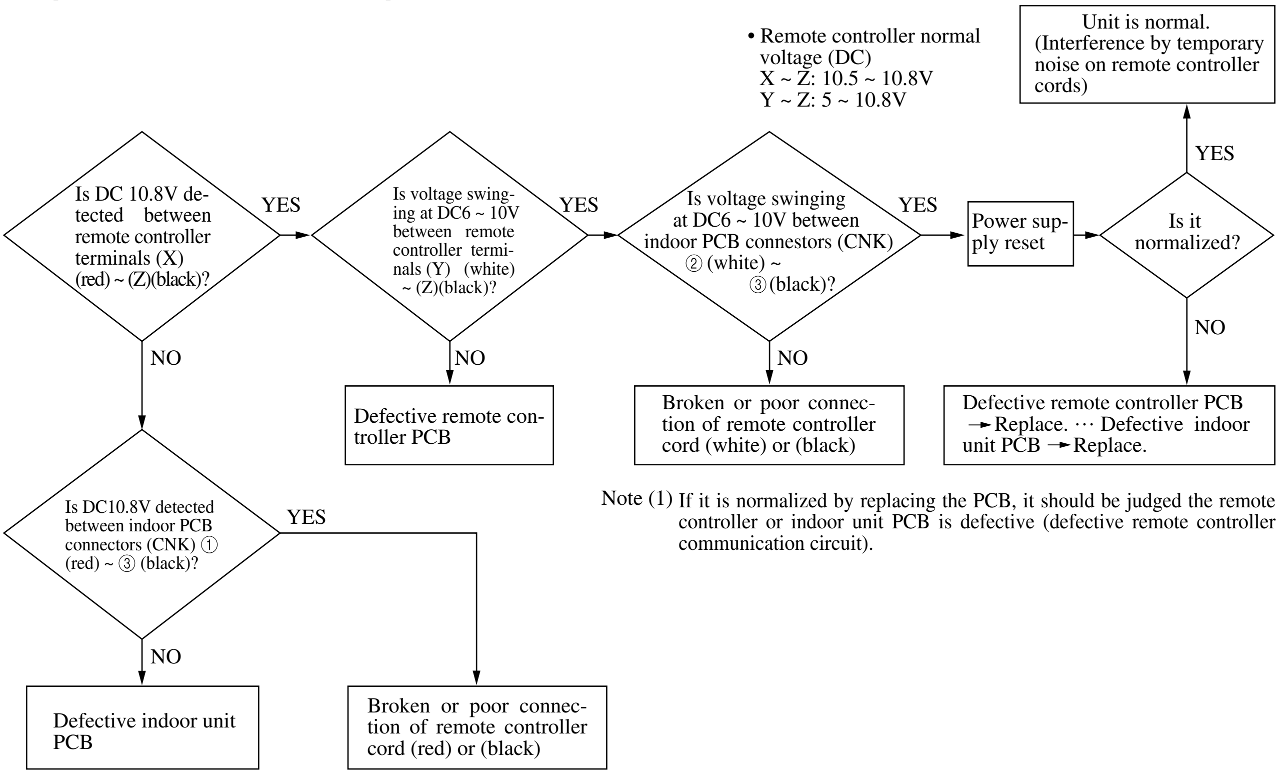
Indoor and outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing (1)

Note (1) With the separate power supplies for indoor/outdoor units, the outdoor unit green LED may flash in some cases.



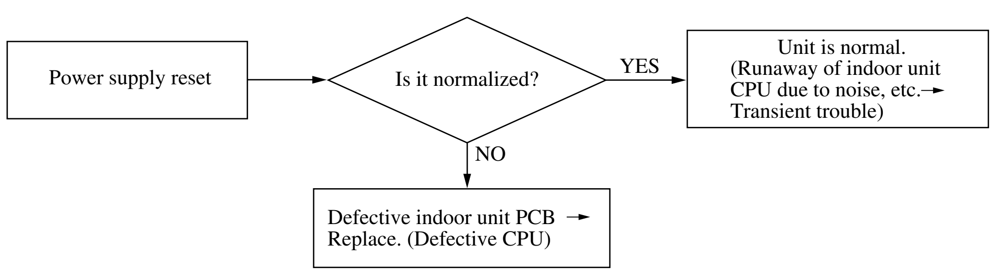
Indoor unit		Outdoor unit	
Red LED	*3 times flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing

* Lamp OFF if remote controller wire is broken at power ON.



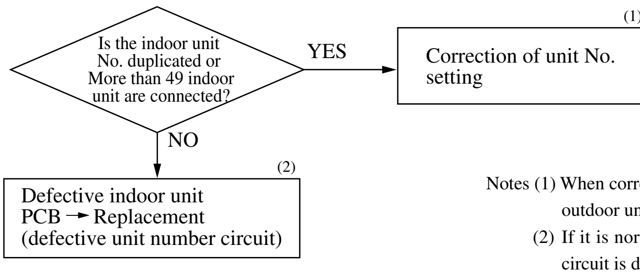
Note (1) If it is normalized by replacing the PCB, it should be judged the remote controller or indoor unit PCB is defective (defective remote controller communication circuit).

Indoor unit		Outdoor unit	
Red LED	Stays OFF or Lights continuously	Red LED	Stays OFF
Green LED	Stays OFF or Lights continuously	Green LED	Keeps flashing



4 Error display: E2 [Duplicated indoor unit No. or More than 49 indoor unit are connected.]

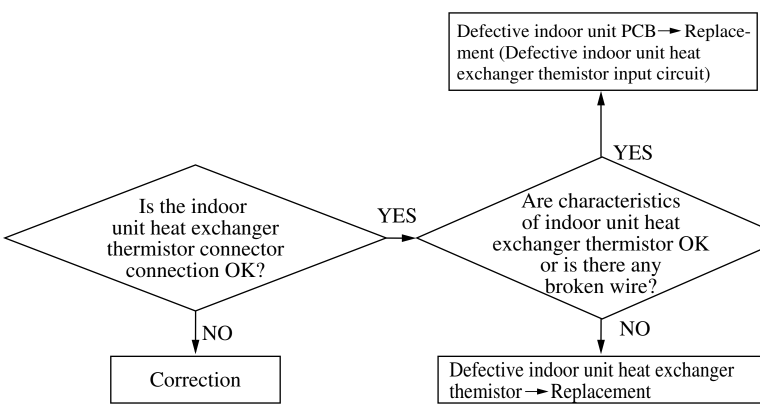
Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



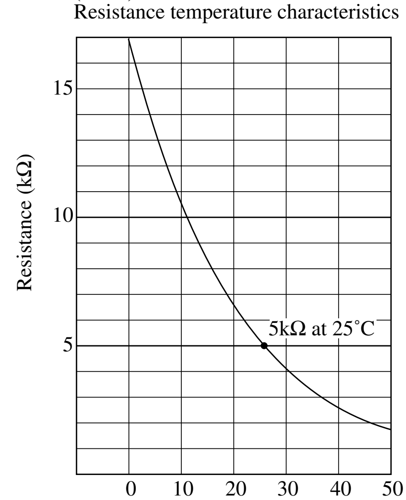
Notes (1) When correcting the unit number, check again the pairing of indoor/outdoor units (same Number assigned to coupled units) is correct.
(2) If it is normalized by changing PCB, judge the unit number input circuit is defective.

5 Error display: E6 [Defective indoor unit heat exchanger thermistor]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



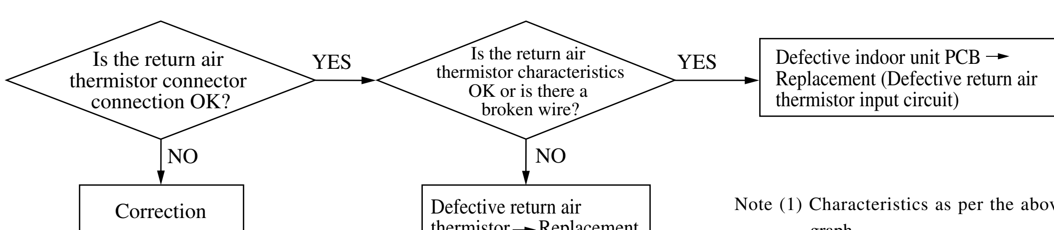
Return air thermistor (Th_{1}-A)
Indoor unit heat exchanger thermistor (Th_{1}-R)
Resistance temperature characteristics



Note (1) 22.5 kΩ at -6˚C

6 Error display: E7 [Detective return air thermistor]

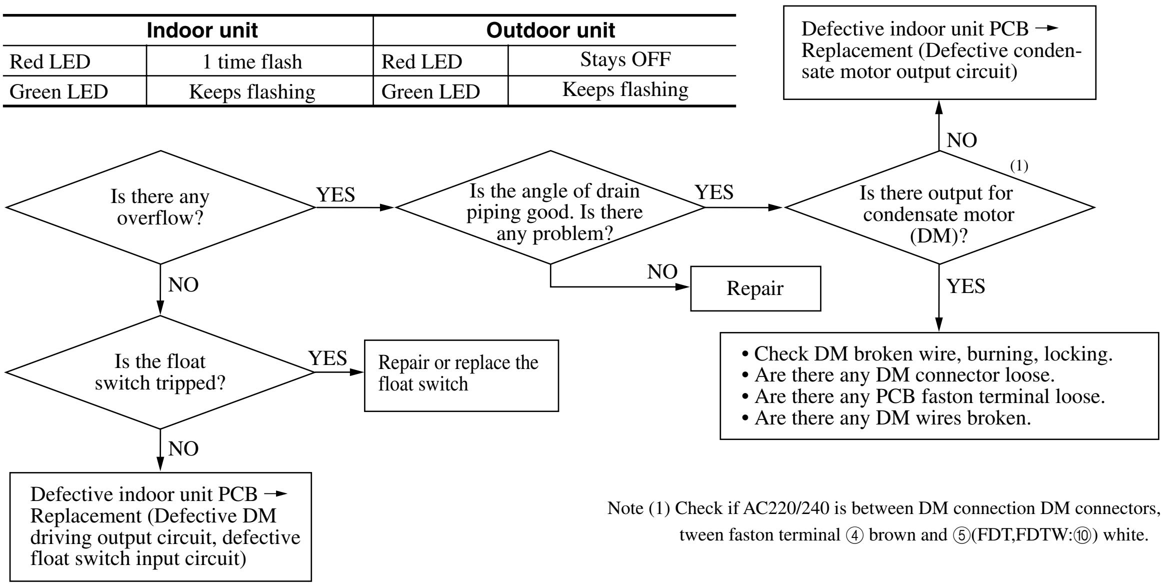
Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) Characteristics as per the above graph.

7 Error display: E9 [Drain trouble]

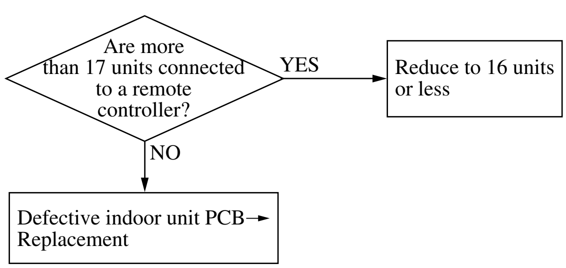
Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) Check if AC220/240 is between DM connection DM connectors, between faston terminal ④ brown and ⑤(FDT,FDTW:⑩) white.

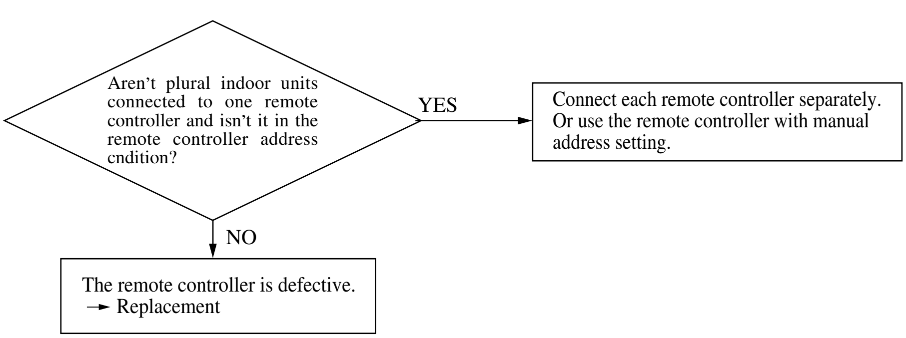
8 Error display: E10 [Control of 1 remote controller VS multiple units — Excessive number of units (more than 17 units)]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



9 Error display: E11 [Addresses setting for plural remote controllers]

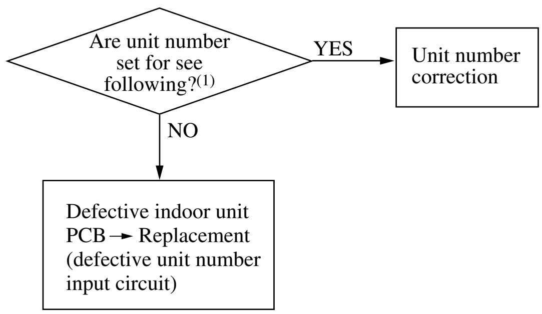
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



10 Error display: E 12

[Address No. combination eroor or addressing is preformed with the following combinations.]

Indoor unit		Outdoor unit	
Red LED	1 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



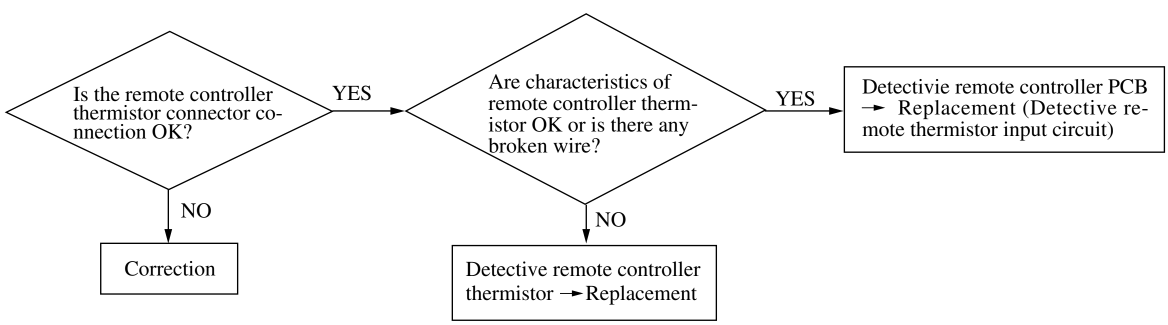
Note (1)

Outdoor unit address No.	Indoor unit address No.
00 ~ 47	48, 49
48, 49	00 ~ 47

11 Error display: E28

[Directive remote controller thermistor.]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



Resistance-temperature characteristic of remote controller thermister

Temperrature(°C)	Resistance value (kΩ)	Temperrature(°C)	Resistance value (kΩ)	Temperrature(°C)	Resistance value (kΩ)	Temperrature(°C)	Resistance value (kΩ)
0	64	14	33	30	16	46	8.5
1	61	16	36	32	15	48	7.8
2	58	18	27	34	14	50	7.3
4	53	20	25	36	13	52	6.7
6	48	22	23	38	12	54	6.5
8	44	24	21	40	11	56	5.8
10	39	26	19	42	9.9	58	5.4
12	36	28	18	44	9.2	60	5.1

(c) Error diagnosis procedures at the outdoor unit side

At the error diagnosis related to the outdoor unit, check at first the error code of remote controller and the illumination patterns of norma l and inspection display lamps in the same manner as the case of indoor unit.

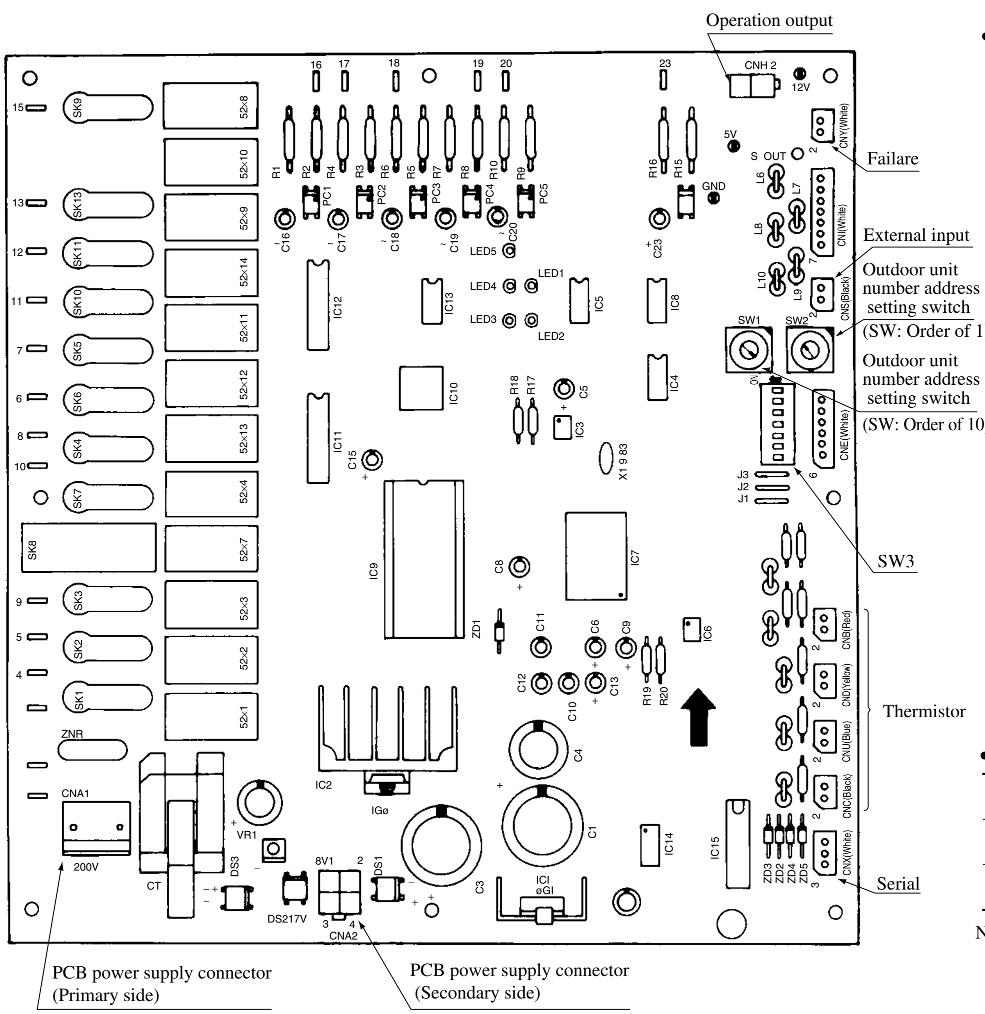
Then estimate the outline, the cause and the location of error based on the pattern and proceed to the inspection and repair. Since the self diagnosis function by means of the microcomputers of indoor/outdoor units provide the judgement of error of microcomputers them selves irregularity power supply line, overload, etc. caused by the installation space, inadequate volume of refrigerant etc., the location and cause of trouble will be discovered without difficulty.

In addition, the display lamps error code of indoor/outdoor units is kept flashing, (except when the power supply is interrupted)after the irregularity is automatically recovered to give irregularity information to the service presonnel. If any mode of higher priority than the error retained in memory occurs after the reset of error, it is switched to that mode and saved in the memory.

(i) Replacement parts assembly related to the outdoor unit PCB

Outdoor unit PCB, outdoor unit inverter PCB, power transistor module, diode module, capacitor, reactor, noise filter, thermistor, (heat exchanger, discharge pipe, outdoor temperature), fuse, transformer, etc.

(ii) Parts layout on the outdoor unit PCB



• Function of DIP switch

Name		Function	Reference page
SW3-1	ON	Check LED reset	—
	OFF	Normal operation	
SW3-2	ON	Easy to start defrosting	154
	OFF	Normal operation	
SW3-3	ON	Measure against snow	155
	OFF	Normal operation	
SW3-4	ON	Trial operation	158
	OFF	Regular operation	
SW3-5	ON	Cooling trail operation	158
	OFF	Heating trail operation	
SW3-6	ON	Compulsory operation	—
	OFF	Regulat operation	
SW3-7	ON	Test mode	—
	OFF	Regular operation	

• Function of jumper wires

Model	J1	J2	J3
FDCP224	With	With	None(1)
FDCP280	With	With	None(1)

Note (1) "None" means that jumper wire is not provided on the PCB or the connection is cut.

• Replacement procedure of indoor unit microcomputer printed circuit board

Microcomputer printed circuit board can replaced with following procedure.

1) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

Model	Parts No.
FDCP224, 280HKXRE2A 224, 280HKXRE2V	PCB505A012L

Inverter frequency monitor

LED3	○	○	○	○	-●-	-●-	-●-	-●-
LED4	○	○	-●-	-●-	○	○	-●-	-●-
LED5	○	-●-	○	-●-	○	-●-	○	-●-
Operation frequency	0~35	35~45	45~55	55~65	65~75	75~85	85~95	95~100

Notes (1) -●- mark: Flashing
○ mark: Stays OFF
(2) Relation between LED3~5 and operation frequency
• LED3......40Hz
• LED4......20Hz
• LED5......10Hz
• Operation frequency = Frequency indicated by LED3~5 + 25

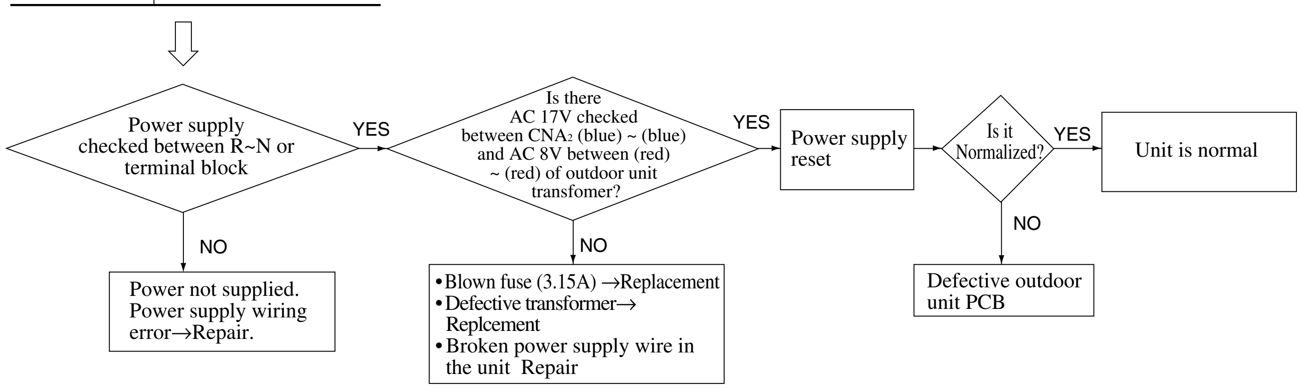
(iii) Check procedure depending on indication lamps (For the outdoor unit)

1 **Error display: E3** **[Error on the outdoor unit signal line]**

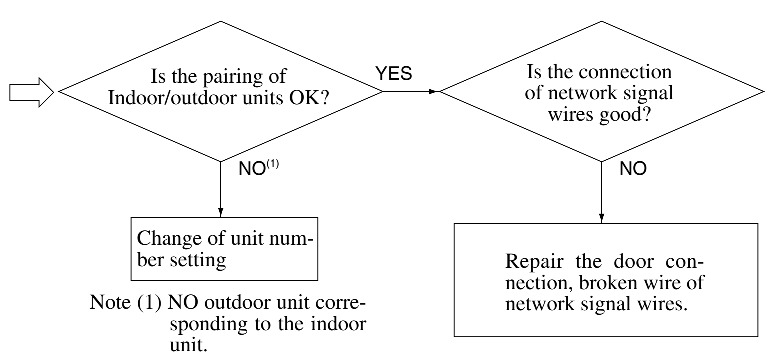
(Detected during operation only)

Indoor unit	
Red LED	2 time flash
Green LED	Keeps flashing

Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF



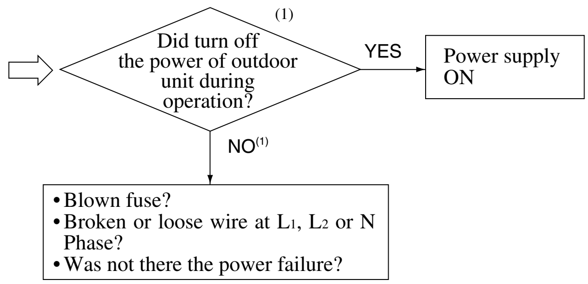
Outdoor unit	
Red LED	Stays OFF
Green LED	Keeps flashing



2 Error display: E5 [Outdoor unit signal line error, power supply error]

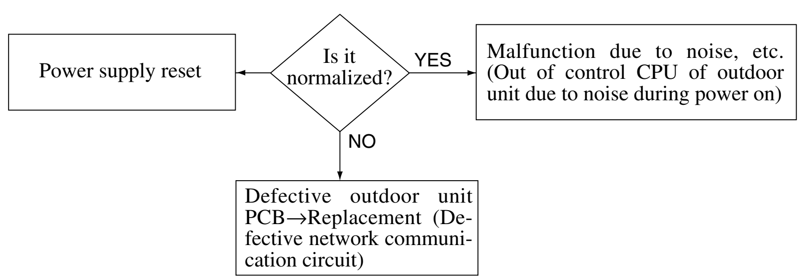
Indoor unit	
Red LED	2time flash
Green LED	Keeps flashing

Outdoor unit	
Red LED	Stays OFF
Green LED	Stays OFF

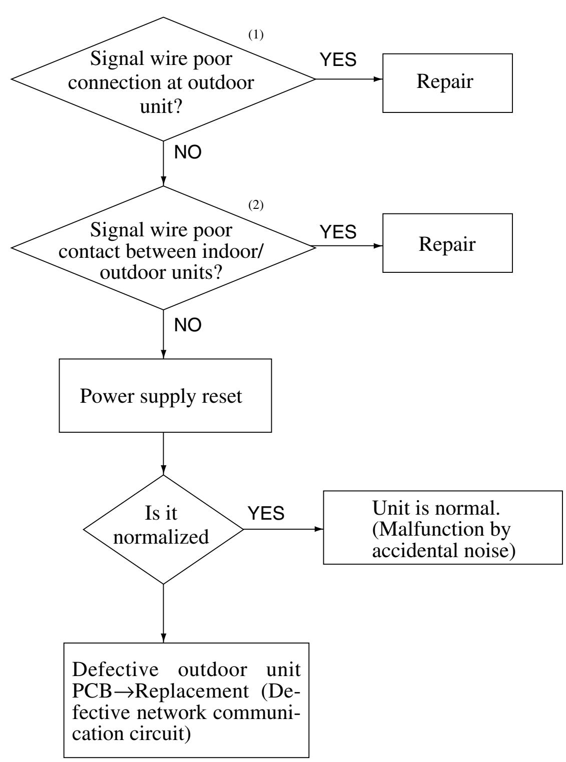


Note (1) This case is limited to the separate power supplies to indoor/outdoor units. (Combination of (indoor unit) red LED 2 time flash and (outdoor unit) green LED stays off means that the power supply to the outdoor unit has been interrupted during operation.)

Outdoor unit	
Red LED	32-sec time flash
Green LED	Stays OFF or Lights continuously



Outdoor unit	
Red LED	6time flash
Green LED	Keeps flashing

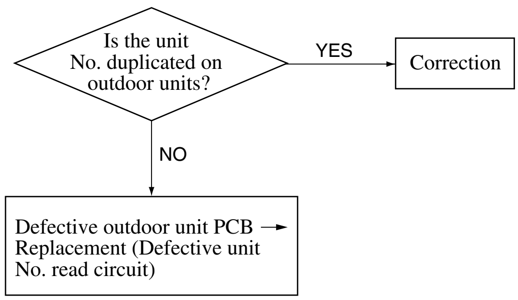


Notes (1) Check for poor connection (Iooseness, misconnection) at outdoor unit terminal block and broken signal wires between outdoor units.

(2) Check the poor connection or broken signal wires between indoor/outdoor units.

3 Error display: E31 [Duplicated unit No. of outdoor units]

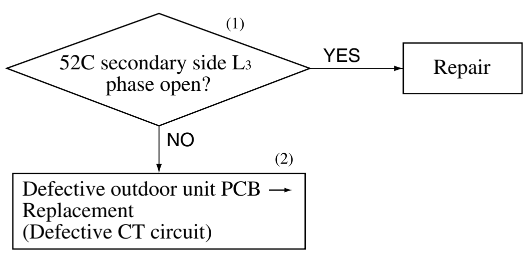
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	8 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Note (1) When the PCB is defective, the flash patterns of outdoor unit red LED, green LED may become irregular.

4 Error display: E34 [Open phase at L_3 phase of 52C secondary side]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	2 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

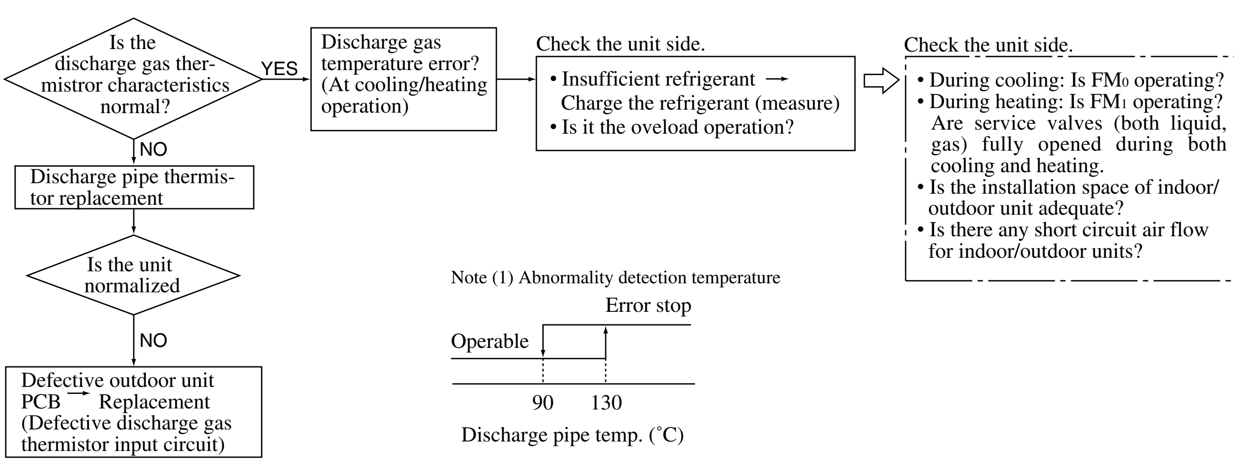


Notes (1) When voltage is detected at 52C primary side but not at the secondary side, check also 52C (broken coil, poor contact).

(2) When voltage is detected at 52C primary side L_3 phase and there is no error at 52C, the outdoor unit PCB (defective $52X_{01}$ circuit or $52X_{01}$)

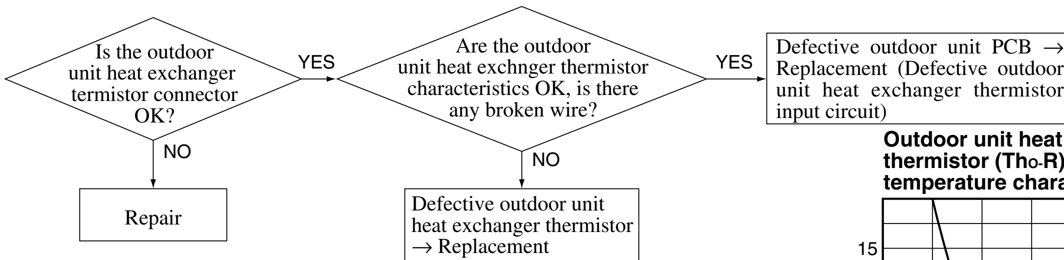
5 Error display: E36 [Discharge temperature error]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	5 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

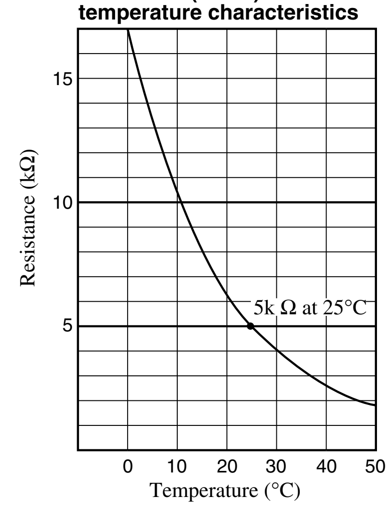


6 | **Error display: E37** | **[Defective outdoor unit heat exchanger thermistor]**

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Keeps flashing
Green LED	Keeps flashing	Green LED	Keeps flashing

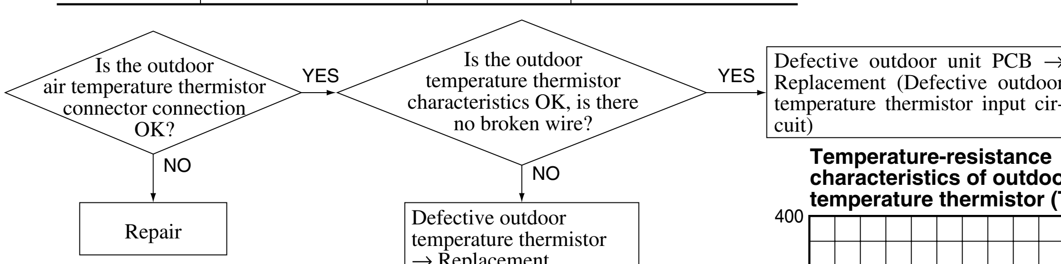


Outdoor unit heat exchanger thermistor (Tho-R) Resistance temperature characteristics

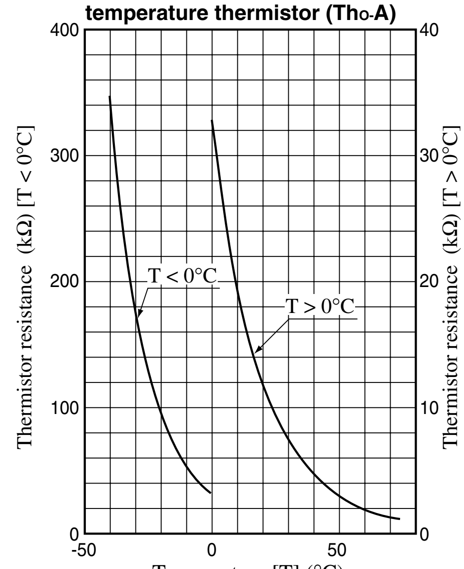


7 | **Error display: E38** | **[Defective outdoor temperature thermistor]**

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Keeps flashing
Green LED	Keeps flashing	Green LED	Keeps flashing

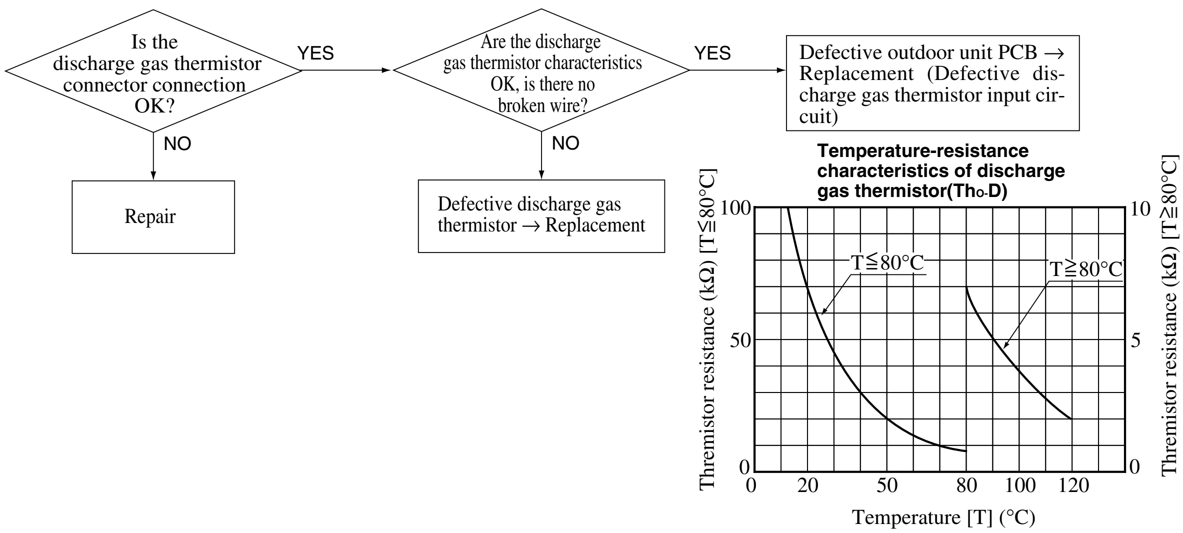


Temperature-resistance characteristics of outdoor temperature thermistor (Tho-A)



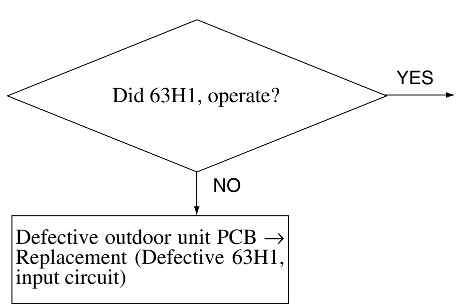
8 Error display: E39 [Defective discharge gas thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Keeps flashing
Green LED	Keeps flashing	Green LED	Keeps flashing



9 Error display: E40 [63H1, operation]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	3 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



At 63H1 operation

1. During cooling
- Is the outdoor unit fan motor operating?
- Is there no short circuit air circulation for the outdoor unit?
- Is there sufficient space for air inlet & outlet?

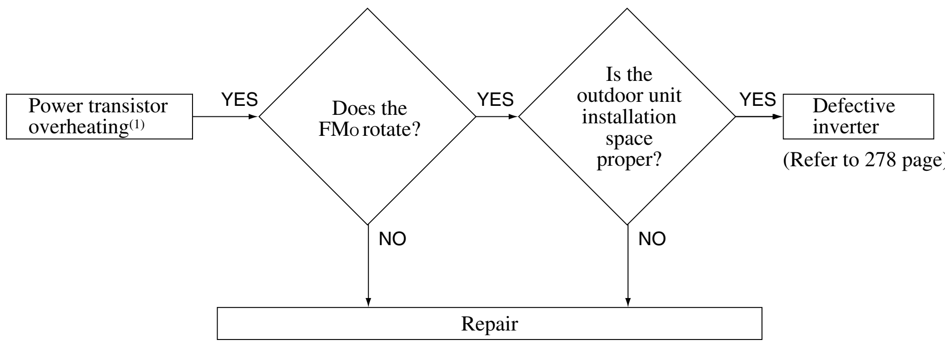
2. During heating
- Is the gas side service valve fully opened?
- Is the indoor unit heat exchanger thermistor detached from the detector case?
- Is the filter clogged?
- Is the outdoor unit fan controlled by due to defective 63H2?

3. During colling / heating
- Is the refrigerant charge excessive?

Note (1) When the wire of 63H1 is broken from the moment of power on, the error E 40 is displayed 40 minutes later.
If the operation is started in this period of time, the operation changes to the thermostat OFF state during cooing, and cool wind blow stops during heating operation.

10 Error display: E41 [Power transistor overheating]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	4 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



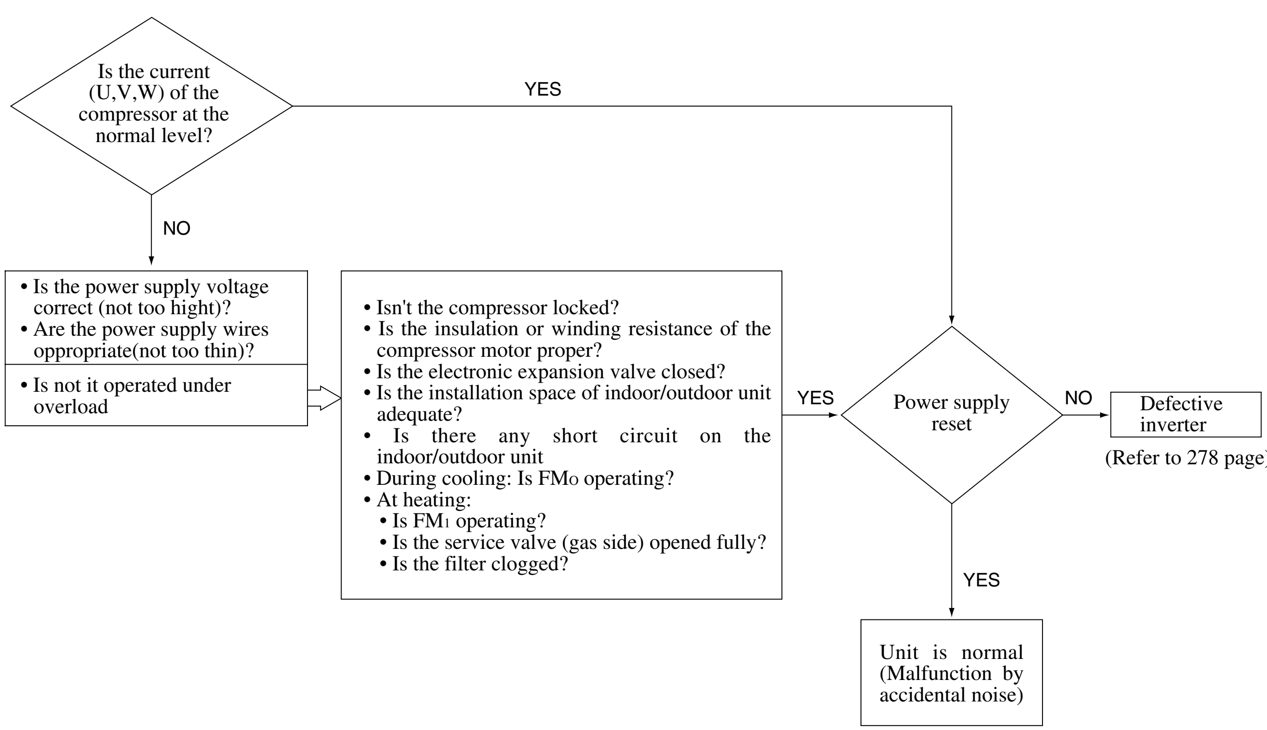
Note (1) The LD2 on the inverter control PCB lights for 3 minutes. Fin thermostat set value: 90°C open/83°C close

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11 Error display: E42 [Current cut]

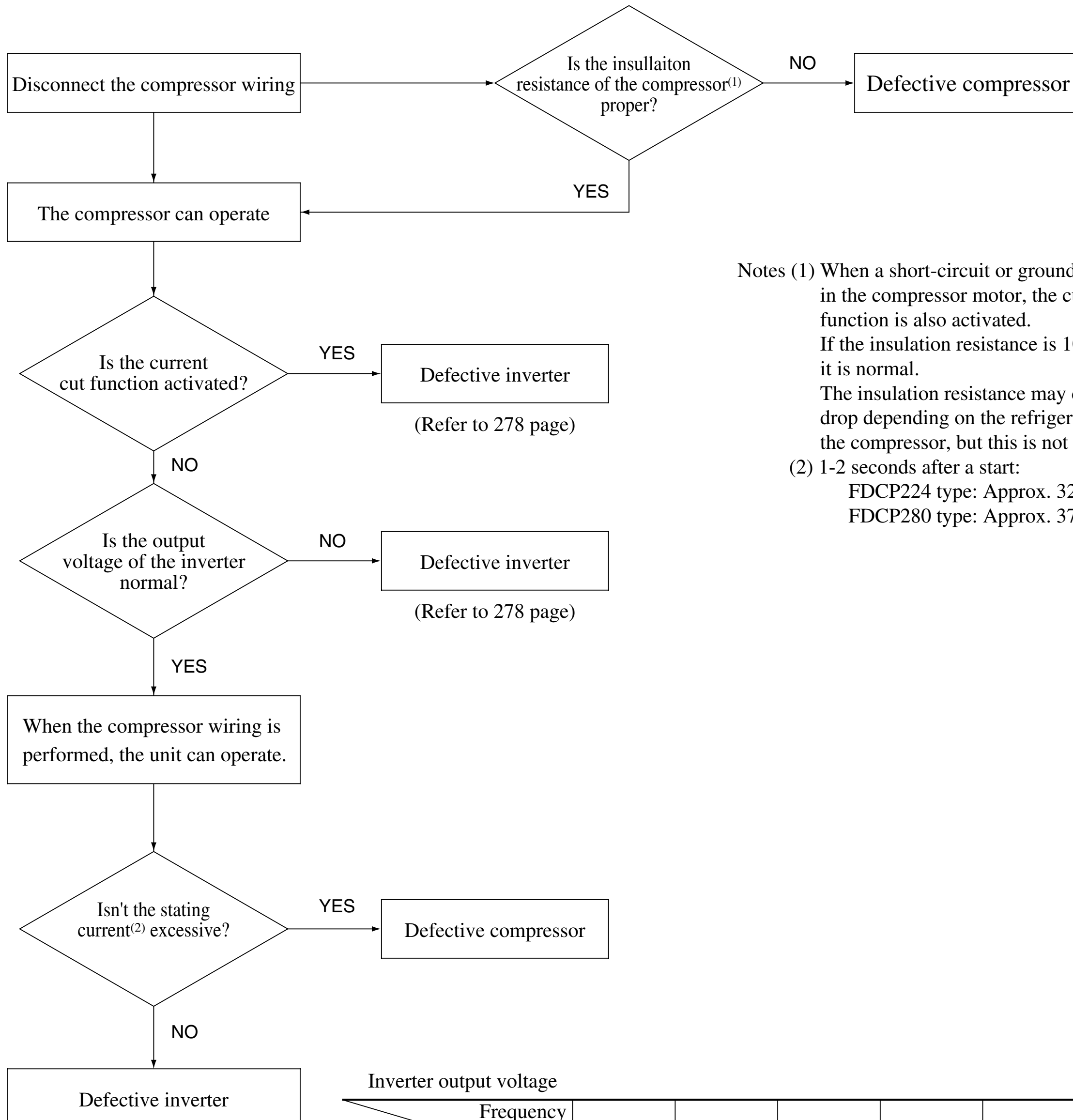
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

Remarks: When current-cut occurs immediately after a start (the Hz value does not increase), check the LD3 on the inverter PCB if an error code is not indicated on the remote controller and the compressor does not operate. When this LD3 is ON, see the next page.



Notes (1) The LD3 lights for 3 minutes.
(2) For details of the check procedure, see the next page.

Current cut is indicated and the compressor cannot operate



Notes (1) When a short-circuit or ground-fault occurs in the compressor motor, the current cut function is also activated.
If the insulation resistance is 10MΩ or more, it is normal.
The insulation resistance may considerably drop depending on the refrigerant volume in the compressor, but this is not faulty.

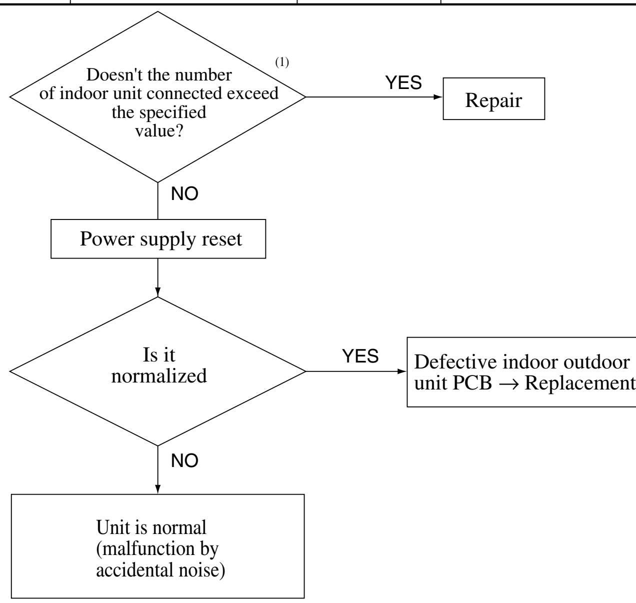
(2) 1-2 seconds after a start:
FDCP224 type: Approx. 32 A
FDCP280 type: Approx. 37 A

Inverter output voltage — Unit: V (AC)

Model \ Frequency	35 Hz	40 Hz	65 Hz	75 Hz	80 Hz	95 Hz
All models (outdoor unit)	95 ~ 98	104 ~ 107	167 ~ 173	180 ~ 190	195 ~ 197	198 ~ 203

12 Error display: E43 [Excessive number of indoor units connected]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	7 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

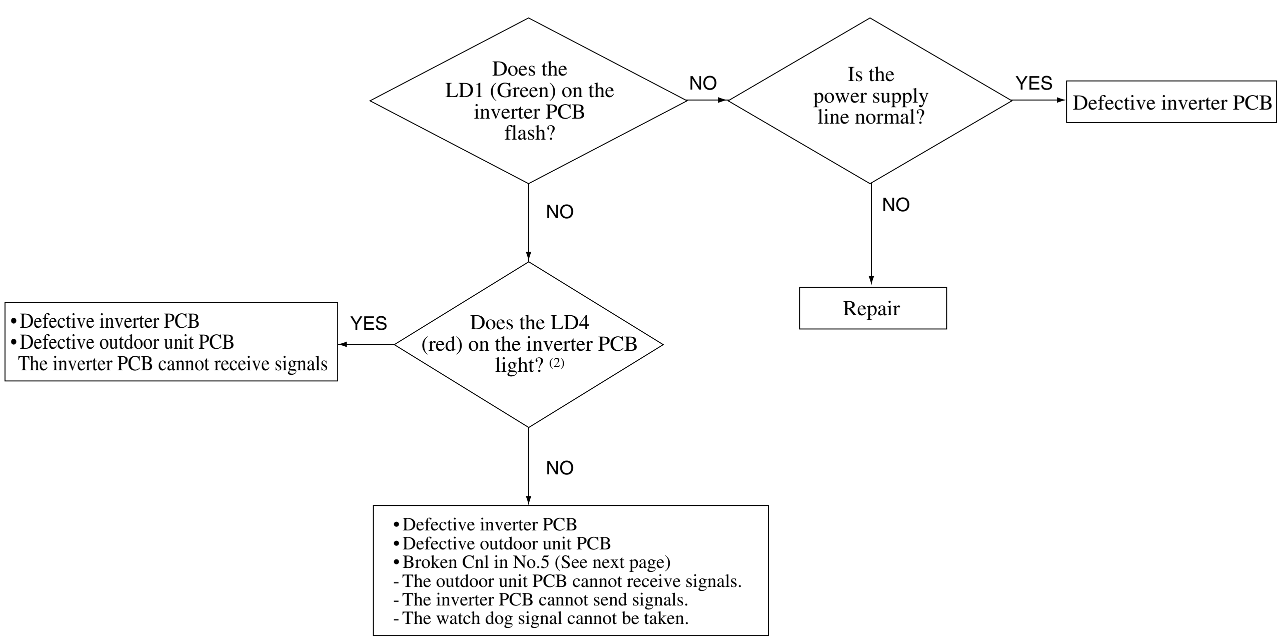


Notes (1) The maximum number of connectable unit of each model is as follows :
FDCP224 :12,
FDCP280 :16.
(2) Outdoor No. setting check for indoor units (to see if outdoor No. is of other system)
(3) In case of auto addressing erase the addresses stored in memory and perform re-setting.

13 Error display: E45 [Transmission error between inverter and Outdoor unit PCB]

Check that the 52C is ON. With the 52C ON, power is supplied to the inverter PCB.

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	9 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



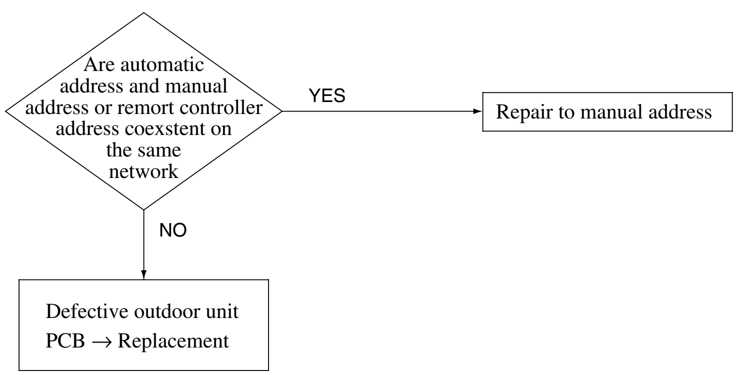
Notes (1) Make a check referring to troubleshooting for inverter (page 278).
(2) When receiving fails, the LD4 comes on at once. If the outdoor unit cannot receive signals for 10 seconds, the 52C is turned OFF. Accordingly, the ON state can be checked only in this period of 10 seconds.

• Communication checked at the CnI, will show hte following values.

Connector		Detail of communication	V(analog tester)
CnI	1	Common	0V
	2	12V power supply	12V
	3	Transmission from inverter	Swings at 11~11.5V
	4	Reception from inverter	Swings at 4.5~5V
	5	Watch dog (communication from inverter PCB to outdoor unit PCB)	Swings at 2~4V
	6	Inverter overheat	5V: normal 0V: abnormal
	7	Current cut	

14 **Error display: E46** **[Automatic address and manual address or remote controller address coexstents in the same network]**

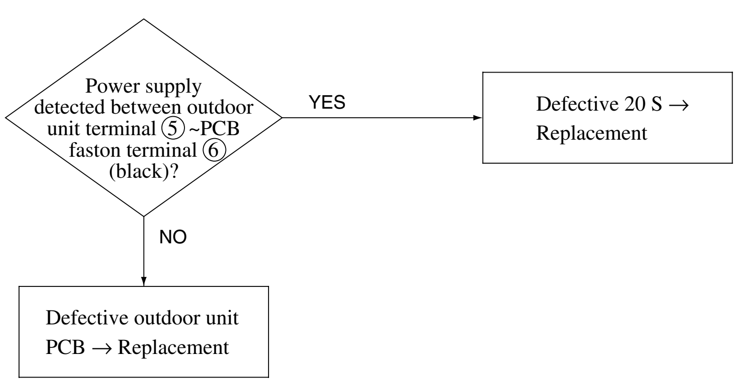
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



(d) How to advance checks for each faulty symptom

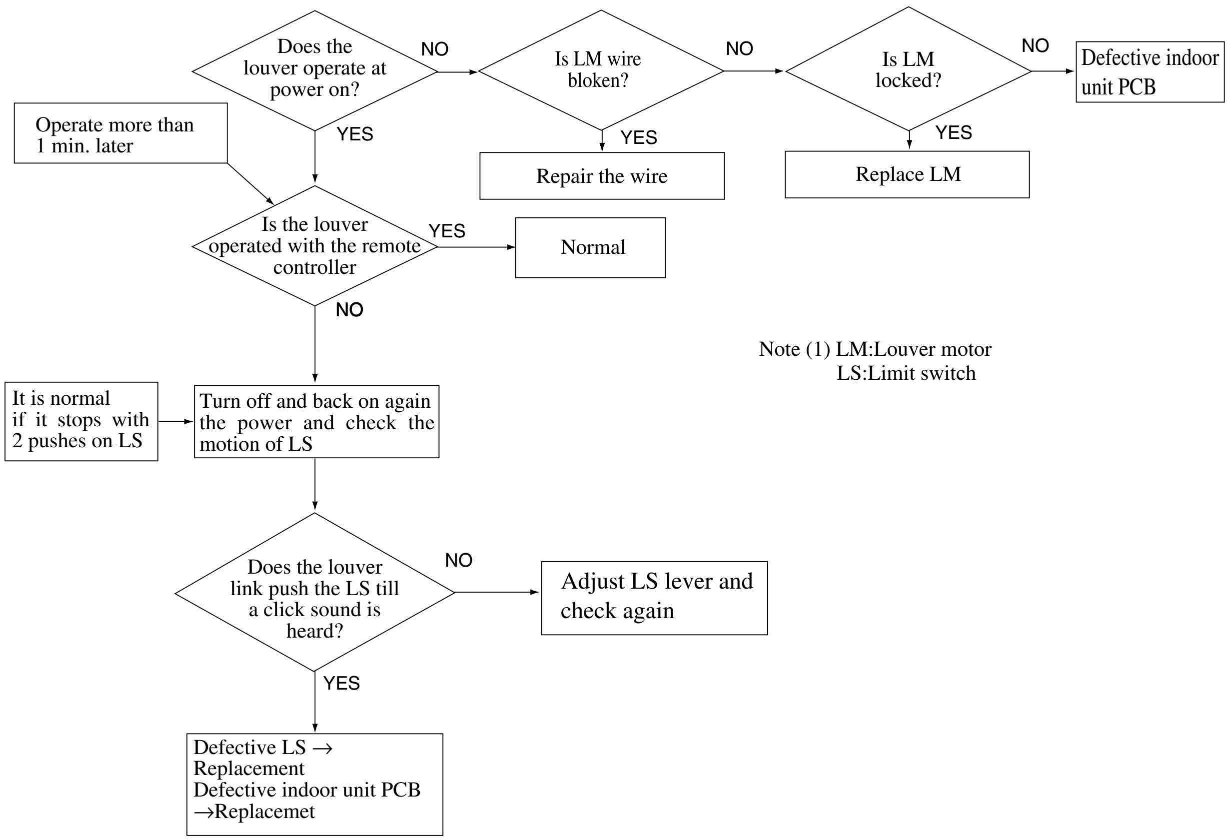
(i) Inspection method when there is no error display

1) Four way valve does not switch during heating operation



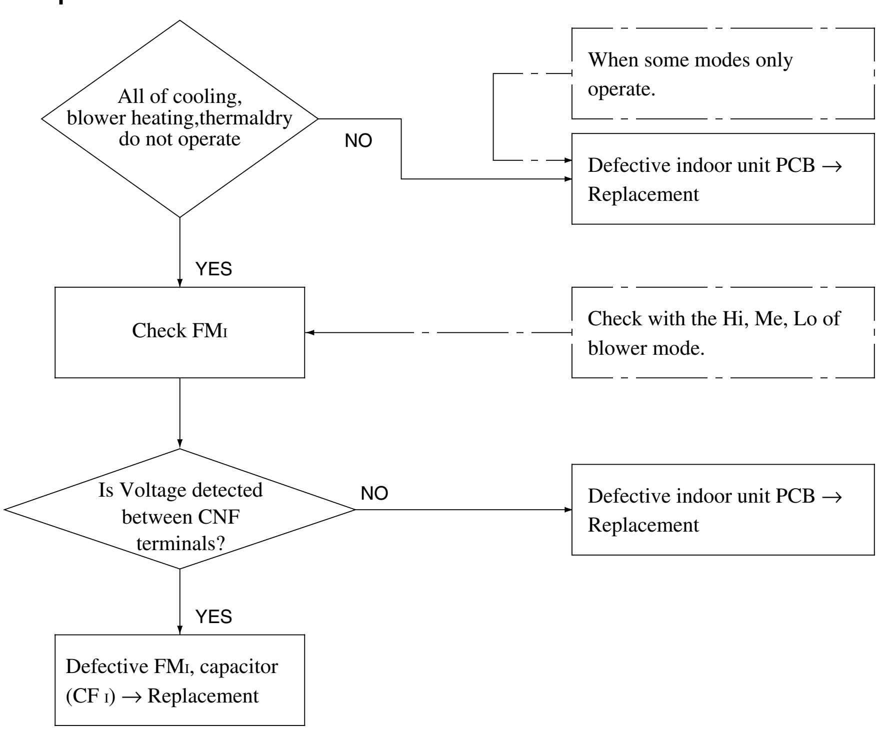
2) Louver motor does not operate

► Inspect at the indoor unit side.

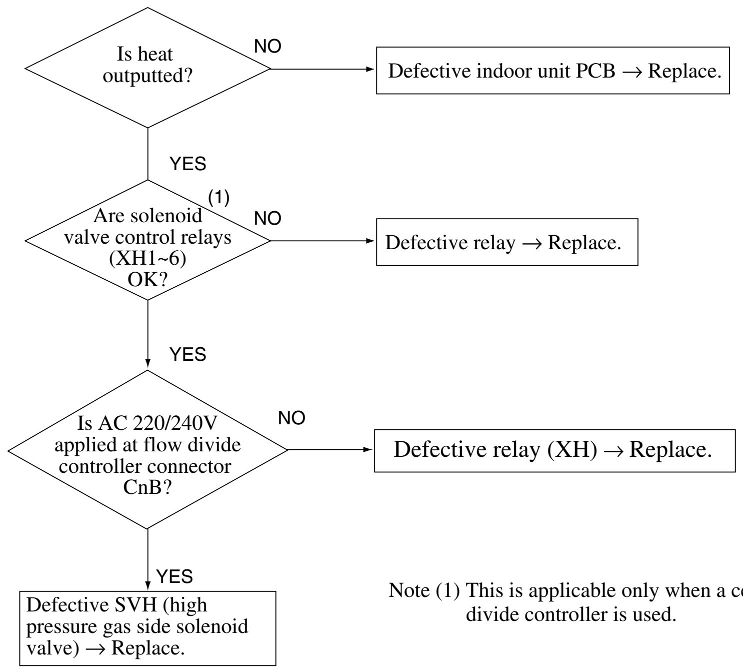


3) When the indoor unit blower does not operate

► Inspect at the indoor unit side.

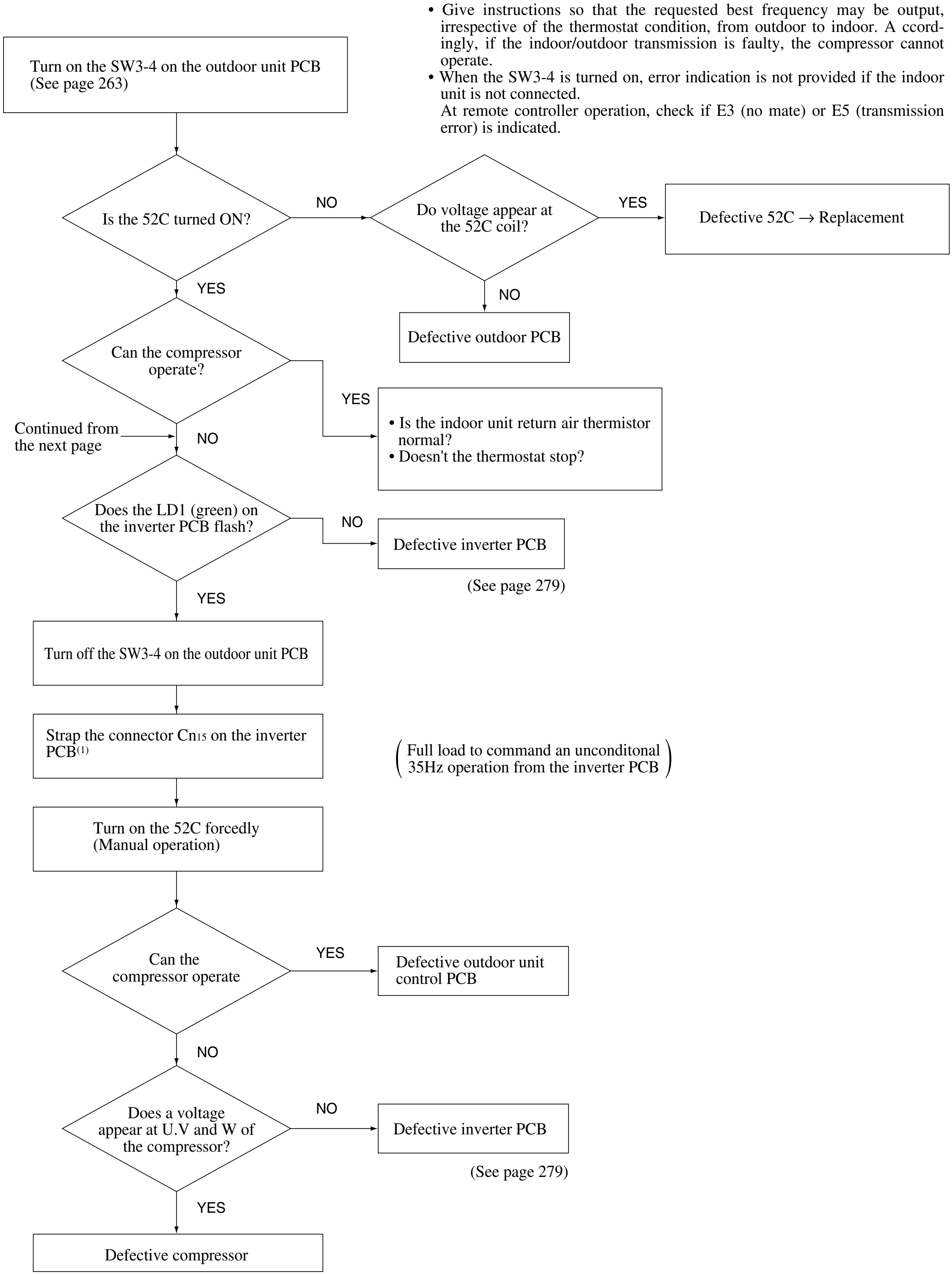


4) **Heating operation does not start**



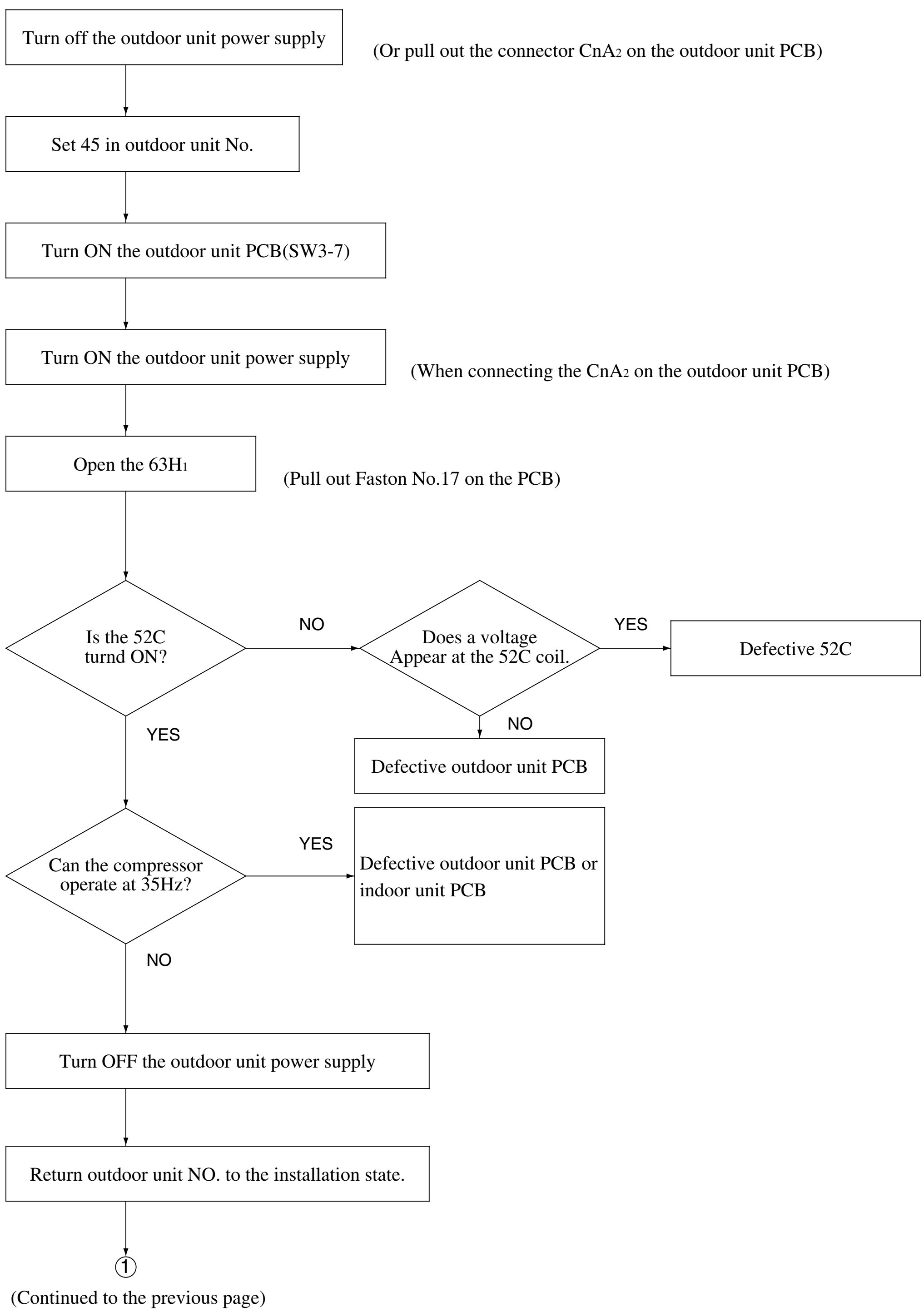
Note (1) This is applicable only when a central flow divide controller is used.

(3) When the remote controller indication is nomal but the compressor cannot operate: (No check indication)



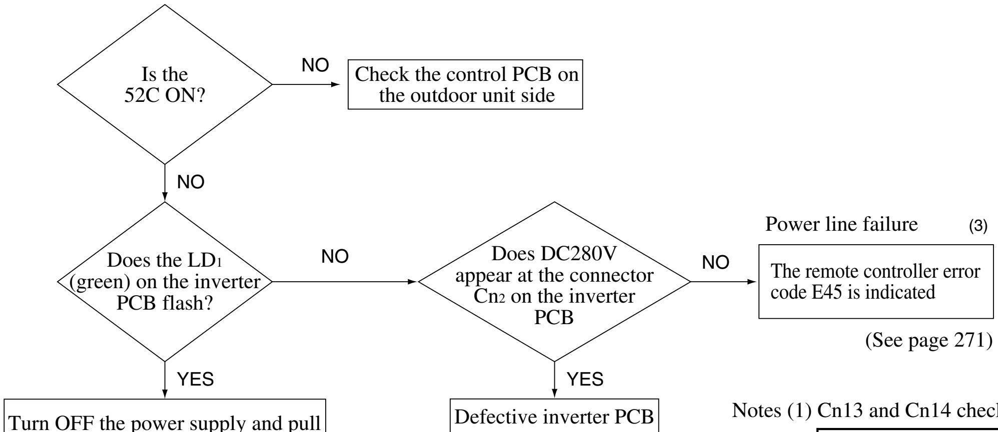
Notes (1) The expansion valve of the indoor unit may be closed or the indoor unit fan may stop. After the compressor is operated, stop it at once. Otherwise, this will cause a failure to the compressor.
(2) The next page shows a checking procedure using only the outside unit.

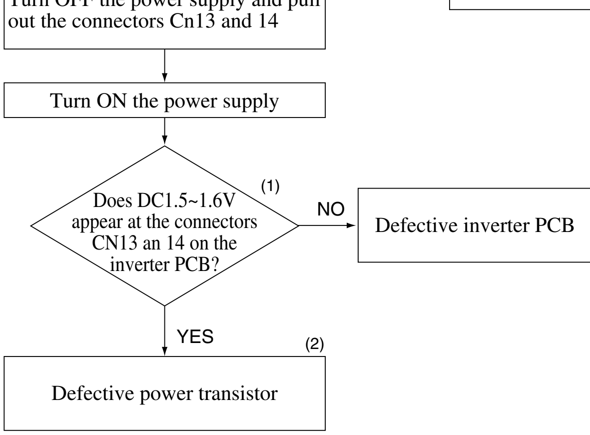
(4) Proceduer for checking the outdoor unit irrespective of indoor/outdoor transmission



Note (1) When using this procedure, the indoor unit enters a transmission error state. In the indoor unit the expansion valve may be closed or the fan may stop. After the compressor is operated, stop it at once. Otherwise, it will cause a failure to the compressor.

(5) Procedure for checking the inverter (No output is provided at the compressor (U,V and W).)





Notes (1) Cn13 and Cn14 check points

Tester bar		Voltage
+	-	
Cn13-6	Cn13-7	1.5~ 1.6V
Cn13-10	Cn13-11	
Cn13-14	Cn13-15	
Cn14-4	Cn14-1	
Cn14-5	Cn14-2	
Cn14-6	Cn14-3	

(2) Check the wirng between the power transistor module and inverter PCB. If it is normal, judge that the power transistor module is fauly.
(3) The 52C turns on, then turn off in 10 seconds. This is repeated 3 times and E45 is indicated.

(6) Cooling(heating) effectiveness is low. (Check the refrigerant volume and refrigerating cycle in addition to the following items.)

1) For low cooling effectiveness
  a) Check if the protective function operates with the result that the operating frequency of the compressor goes below the specified frequency value.
     Note (1) When the current safe control and discharge temperature control are activated, the frequency is lowered.
  b) Check if the operation of the indoor unit expansion valve is normal or there is no clogging.
  c) Check if the anti-frost function operates.

Procedure for Checking Indoor unit Electronic Expansion Valve Operation

Check the indoor unit controller to expansion valve output according to the following procedure.

► Measure the voltage value appearing at the pin on the control side of the expansion valve (SM) connector CnA (white, 6P (5-conductor), and also the duration of voltage application.

Orange~Gray, Yellow~Gray
Red ~Gray, Black ~Gray } Approx DC5V(2) for 15 seconds(1) when the power supply is turned on.

Notes (1) After the power supply is turned on, the voltage is about 5 V for 8 seconds, decreases momentarily, and then is kept at about 5 V for about 7 seconds.
(2) When a measurement is made with a digital multitester, voltages of 6-3 V are output in sequence.

► When the above duration and voltage value can be verified, the indoor unit controller is normal.
If the expansion valve does not operate (no operating sound is produced) though a voltage is provided, the expansion valve is faulty.

► By changing the setting of the thermostat, the expansion valve is operated in about 20 seconds. Like the above, a DC voltage of about 5 V can be checked at the connector CnA.

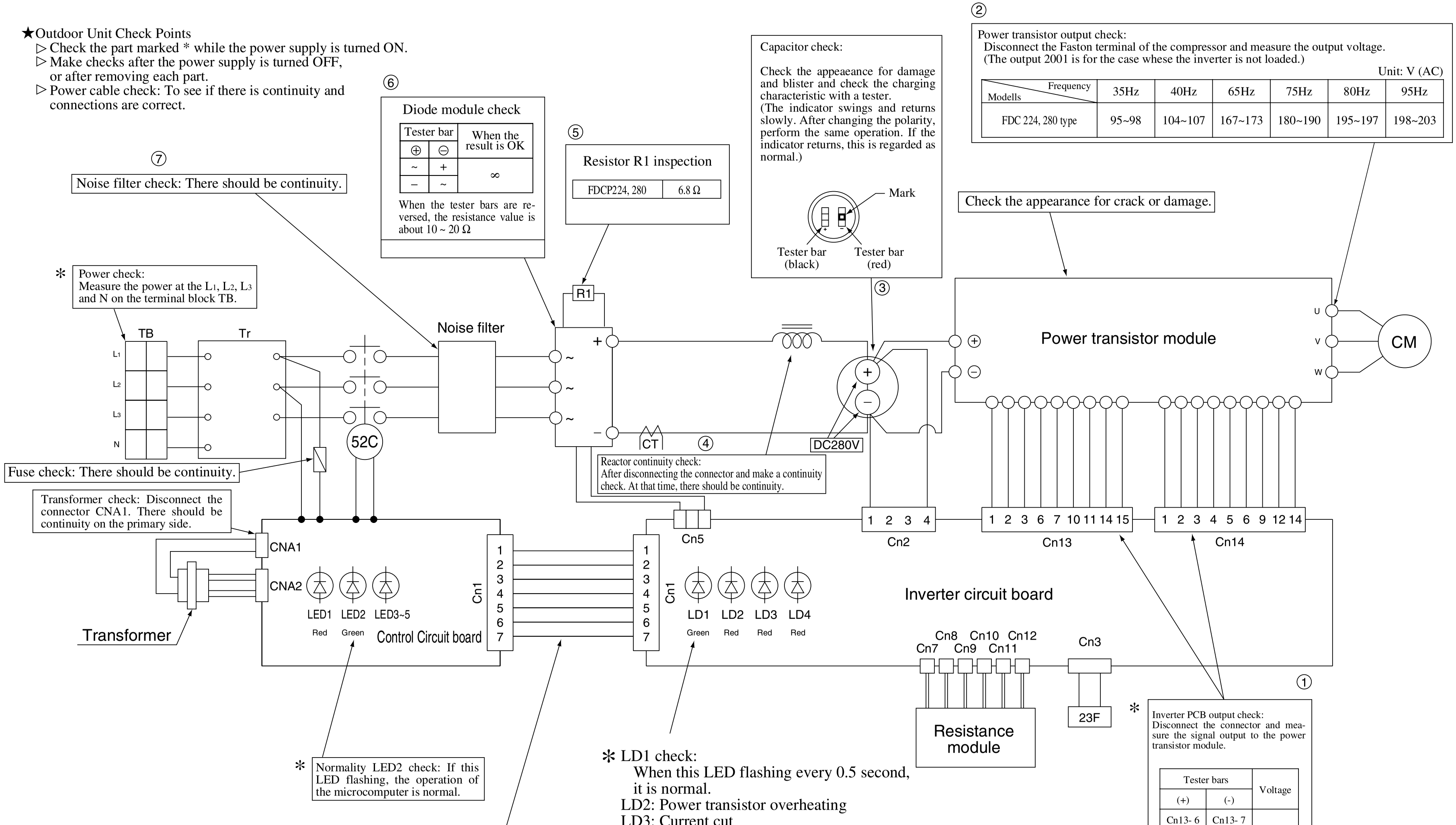
2) Low heating effectiveness.
  a) Check if the operating frequency of the compressor is lowered below the specified frequecny because the protective function is activated.
     Note (1) When high pressure control [63H2 : 2.26 open/2.84 closeMPa], current safe control and discherge temperature control is exerted, the frequecny is lowered.
  b) Check if the operation of the outdoor unit expansion valve is normal, or if any clogging occurs.

◆ Troubleshooting on the inverter side

(1) Troubleshooting procedure (For the details of 1 to 7, refer to Outfoor Unit Check Pointd on the next page.)



★Outdoor Unit Check Points
▷ Check the part marked * while the power supply is turned ON.
▷ Make checks after the power supply is turned OFF, or after removing each part.
▷ Power cable check: To see if there is continuity and connections are correct.



Tester bars (+)	Tester bars (-)	Voltage
Cn13- 6	Cn13- 7	DC 1.5 ~ 1.6V
Cn13-10	Cn13-11	
Cn13-14	Cn13-15	
Cn14- 4	Cn14- 1	
Cn14- 5	Cn14- 2	
Cn14- 6	Cn14- 3	

Communication checked at CNI will show the following values.

Connector		Contents of communication	V (analog tester)
Cn1	1	Common	0V
	2	12 V power supply	12V
	3	Transmission from inverter	Swings between 11V and 11.5V.
	4	Reception from inverter	Swings between 4.5V and 5V.
	5	Watch dog (communication from the inverter circuit board to the outdoor unit PCB)	Swings between 2V and 4V.
	6	Inverter overheating	5V: normal, 0V: abnormal
	7	Current cut	5V: normal, 0V: abnormal